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The Annals

OF

Scottish Natural History

A QUARTERLY MAGAZINE

WITH WHICH IS INCORPORATED

"The Scottish Naturalist"

EDITED BY

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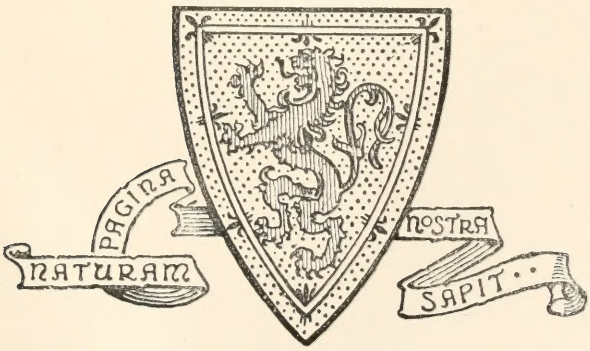

EDINBURGH

DAVID DOUGLAS, CASTLE STREET

LONDON: R. H. PORTER, 7 PRINCES ST., CAVENDISH SQUARE

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LIST OF PLATES

I. *Centrolophus niger*, Gmelin.

II. *Philodina brevipes*, n.sp.; *Philodina acuticornis*, n.sp.; *Philodina decurvicornis*, n.sp.; *Philodina obesa*, n.sp.

III. *Philodina hexodonta*, Bergendal; *Callidina ornata*, n.sp.; *Rotifer quadrioculatus*, n.sp.; *Rotifer spicatus*, n.sp.

IV. *Raia circularis*, *R. radula*, *R. radiata*.

V. Spinulation, etc., of *R. circularis* and *R. radula*.

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The Annals
of
Scottish Natural History

No. 41] 1902 [JANUARY

THE LATE REV. HUGH ALEXANDER MACPHERSON.

IT is with extreme regret that we have to record the decease of our old and much-valued contributor, the Rev. Hugh Alexander Macpherson, which took place, after a few days' illness, at the Rectory, Pitlochry, on the 28th of November last. We had seen him in Edinburgh only a few days previous to the sad event, and had received his note on "Siskins in Perthshire" for the present number of the "Annals," along with an interesting letter touching upon many subjects, as late as the 22nd, so that his untimely and wholly unexpected death came as a painful surprise.

The grandson of Dr. Macpherson, Professor of Greek at King's College, Aberdeen, and the eldest son of Mr. Wm. Macpherson, the editor of the "Quarterly Review," he was born at Calcutta forty-three years ago, and was educated at Haileybury and at Oxford. Soon after leaving Oxford, where he graduated with honours in 1881, Mr. Macpherson took up his residence in Carlisle, as curate of St. James' Church, and commenced those studies in the fauna of the Lake Country with which his name will always be associated. Thus, in 1886, he published, along with Mr. William Duckworth, "The Birds of Cumberland," to be followed,

in 1892, by his more important work on the "Vertebrate Fauna of Lakeland"—one of the best books of its kind ever written. Nor were these his only labours of love in connection with science in the county of Cumberland, for he was one of the moving spirits in the founding of the Carlisle Museum, an institution in which he took a most lively and practical interest down to the very last, and which owes much to his enthusiasm, ability, technical knowledge, and donations. In 1897 he became vicar of Allonby, near Maryport, and contributed to this Journal a number of interesting observations on the natural history of the southern shores of the Solway Firth.

In 1899 he came to live among us as Rector of Holy Trinity Church, Pitlochry, and from time to time sent us many valued records on the animals of interest that came under his notice in that district of Perthshire. Mr. Macpherson was the proprietor of an estate in Skye, and it is well known to his friends and fellow-workers that he had for many years been engaged on a book on the Vertebrata of that island, a work that we trust will see the light, for in it we should have a most valuable contribution to the Natural History of Scotland.

Mr. Macpherson was interred at Carlisle, in accordance with his expressed wishes. He thus rests amidst the chief scenes of his labours both as a clergyman and a naturalist, and where he made many friends, and raised memorials to his worth and usefulness that will long survive him.

In Scotland we expected to reap much from his presence as a worker in our midst, but, alas! he has been taken from among us in the prime of life, and we have to mourn the loss of an enthusiastic, scholarly, and accomplished naturalist.

THE STARLING ROOST ON CRAMOND ISLAND.

By Charles Campbell.

Cramond Island is situated in the Firth of Forth about a mile from the mouth of the river Almond. It extends to nearly 19 acres, and is accessible on foot at low water. On

the southern slope of the island is a small plantation of dwarf Scotch firs surrounded by a stone wall.

For some years back this plantation has been the roosting-place of great flocks of Starlings. It was not, however, until the autumn of 1899 that they began to excite general attention and interest in the neighbourhood.

Quite as remarkable as the large number of Starlings frequenting the island is the regularity with which they perform their daily journey. They seem to have some gathering-place farther inland, and often pass overhead in one large flock, when the beat of their wings causes quite a commotion in the air. No matter what the weather may be, they regularly perform their journeys across the water of the Forth. I have watched them battling against an easterly gale, when they had to fly so low as almost to touch the waves, and when some of the weaker birds were driven back to the shore.

Sometimes, on a calm night, they fly high overhead, but seldom so high that the beat of their wings cannot be heard.

One would naturally have expected that with the approach of the breeding season the colony would disperse ; but this was not so, and quite large flocks continued to roost on the island. Mr. W. Evans estimates the proportion of non-breeding birds at about ten per cent, but the proportion which travelled daily to and from the island seemed to exceed that number.

No nests have been found on the island, and during the day it is quite deserted, not a Starling remaining on it.

I have not been able to trace how far inland the Starlings travel. I am of opinion, however, that each band has its own particular feeding-ground which it regularly frequents. What confirms me in this belief is the fact that every morning I have watched the Starlings passing over Longgreen, Dalmeny Park, about a dozen birds regularly detach themselves from the flock and settle on an ivy-clad tree close by. It was most interesting to watch for this little group of birds, which afforded a striking example of the orderly manner in which the movements of the whole colony are regulated.

The following is a record of their migrations during the different months :—

May, 1900.—On the 7th inst. the Starlings left the island at 5 A.M. and were seen returning in large numbers at 7.15 P.M. Mr. Hogg saw them leave the island at 20 minutes past 3 A.M. on the 29th inst. The latest hour at which I saw them cross was at 9.15 on the 31st inst.

June.—During this month the flocks were not so large, and generally crossed over to the island at 8.30 P.M.

July.—On the 3rd of this month the Starlings were seen to leave at 4.50 A.M. A flock of Starlings flew against the telegraph wires at Cramond Brig on the 6th inst., and about a score were killed. On the 7th I noticed flocks of Starlings crossing over from 8 to 9.30 P.M. Their manner of flight was very varied, some moving slowly and with an undulating motion, and others straight and swift without deviation. These I took to be old and young birds. On the 14th inst. a flock again struck the wires at Cramond Brig, and I counted 47 dead birds, all of which were young ones. From the nature of their injuries, they must have been travelling at a great speed when they struck the wires. On the 20th the morning flight was timed at 5.30, and in the evening at 7.30. Weather cold and stormy. On the 30th July a large flock crossed over at 8.45 P.M. During this month there was an appreciable increase in the number of Starlings frequenting the island.

August and September.—On the 2nd August the evening flight was at 8.40 P.M. and on the 11th at 7.30. On the 13th the morning flight was timed at 5.30. From this date on to the middle of September the Starlings crossed more to the east, over Cramond village, and did not come under observation so often. On the 13th September the Starlings crossed at 6.30 P.M. From the 16th to the 30th the evening flight was at 6 P.M., and they returned about the same hour in the morning.

October.—From the 1st to the 7th of this month the Starlings crossed at 5.30 P.M., and returned in the morning at 6.30 A.M. On the 7th the evening flight was as early

as 4 P.M. Weather very dull. On the 20th great numbers of Starlings assembled on the trees at Cramond at 4.40 prior to crossing to the island. 23rd.—At ten minutes past seven an immense flock of Starlings came over: west wind and rain, and the birds flying very low. The Starlings have now resumed their old route, that is, crossing directly over Longgreen. The morning flight on the 27th is timed at 7.5 and in the evening at 4.45. On this day, for the first time, they are noted to go through some extraordinary evolutions prior to settling down. On the morning of the 29th a great rush of Starlings came over at 7.5, flying very low. I am of opinion that during this month the colony attained its numerical maximum.

November.—On the 1st of this month the morning flight was at 7.5 A.M., and in the evening at 4.30 P.M. On the 20th they are noted as passing at 7.30 A.M. and 4.5 P.M. An immense flock extending right across Longgreen Bay from Barnbougle to the Snib came across on the morning of the 12th at 7.25. They were followed a few minutes later by another flock. The morning of the 20th was dull and hazy, and the Starlings did not leave the island till 8.50. Watching on the morning of the 22nd with my field-glasses, I saw the Starlings rise in a cloud from their roost. In 2 minutes 25 seconds they were overhead, flying leisurely against a south-west wind. On the 28th the Starlings came over at 7.50 A.M. and returned at 3.45, flying low, and in great numbers. During this month the most interesting feature observed has been the extraordinary manœuvres performed before settling to roost. It would be no easy task, were it desirable here to do so, to describe the graceful evolutions of the birds on these occasions, or to guess at what mysterious influence controls their movements.

December.—On the 1st of this month I went over to the island to watch the Starlings arrive. At 3.25 the first few dropped down, followed in about 5 minutes by another small lot. At 3.45 four distinct flocks were

manœuvring at a great height. At 3.55 they all settled down. At 4 P.M. the Longgreen flock commenced to arrive, and settled to roost at once. The whole flock were now chattering in their characteristic fashion. Bands of them continued to arrive till I left the island at 4.15. Mr. Hogg says they seem to keep up their talking all night long. If he goes into the plantation at night with a lantern the birds flutter round the light in great numbers. During the month there was little variation shown in the times of flight. On the 2nd the morning flight was at 8 A.M., and the evening 3.45. On the 15th the Starlings crossed at 8.15, and returned at 3.30 to 4 P.M. At the end of the month the morning flight was timed at 8.30, and in the evening 3.45 to 4 P.M.

January, 1901.—On the 1st of the month the morning flight was at 8.15. In the evening there was an unusual commotion among the Starlings. It was bright moonlight, and, instead of crossing to the island, they settled for a time in Longgreen woods, breaking up into small flocks and flying about in a state of great excitement. On the 2nd they seemed to have the same hesitation in going to the island. About the middle of the month the morning flight was at 8.15, and in the evening at 4.30. On the 30th the morning flight was at 8.10, and in the evening 4.45 to 5 P.M. During the mild weather prevailing during this month the flocks of Starlings seemed to decrease in size. Numbers of pairs could be seen about the woods, as if preparing to nest. With the return of colder weather the colony seemed to increase again.

February.—In the beginning of this month the morning flight was at 8 A.M., and the evening flight about 5 P.M. On the 13th the Starlings left the island at 7.35 and returned at 5.30. During the calm frosty weather which occurred at this time the flight of the Starlings was so high that the birds were almost invisible. On the 12th I saw them rise from the island at 7.40 A.M., but lost sight of them, and I believe they passed

overhead quite out of sight. At the end of the month the morning flight was timed at 7.10, and the evening at 5.15.

March.—On the 2nd of this month the morning flight was at 7.15. On the 7th the Starlings came over at 6.40, and returned in the evening at 5.45. Professor J. Arthur Thomson of Aberdeen University, who was at Cramond on the 10th inst., saw a flock manœuvring at Cramond Island and estimated their numbers at not less than 10,000. On the 25th inst. I have noted in my diary "the Starlings seem to be gradually getting less in numbers."

April.—On the 13th of this month I have noted that the Starlings still cross to Cramond Island in considerable numbers, but I also noticed that in different parts of Dalmeny woods, especially in rhododendron bushes, small flocks of Starlings are to be found roosting.

May.—On the 1st of this month the Starlings are timed as crossing at 7.40 P.M. Small flocks of Starlings were seen passing in the evenings from 7.15 onwards. On the 26th they were seen in larger numbers, probably owing to a strong east wind and rain causing them to fly low. I noticed that by the 31st most of the young Starlings reared in Dalmeny woods had "flown."

June.—Broods of young Starlings were noticed feeding on the grass lawn in front of Dalmeny House on the 2nd inst. On the 12th inst. I have noted that the Starlings are now crossing regularly from 7 P.M. On the 16th a very decided increase in the number of Starlings crossing to Cramond Island was noticeable. The first flock was seen at 6.30, and for an hour afterwards flocks of a considerable size continued to go over. On the 17th they were seen coming from the island at 4.5 A.M. "just as in winter." Up to the end of the month they crossed from 7 A.M. in flocks of varying size.

From the beginning of July and on to the end of November the daily observations of the Starlings were practically identical with those of the corresponding period of 1900.

There was a gradual increase in the number of birds frequenting the island from the middle of July onwards, and by the end of September the colony was again very large. During the month of October the numbers still increased, and at the end of the month I think the Starlings were more numerous than in any previous season.

On the 12th of November a very severe gale blew from the east. As the woods of Dalmeny abound in sheltered nooks where the rhododendron bushes offered a secure retreat, it would naturally be supposed that the Starlings would not have left the mainland to face the storm. The homing instinct, however, proved too strong, and though they were forced to rest for a time on a strip of bent grass near Longgreen, the Starlings crossed to the island as usual. On the morning of the 13th the gale had somewhat moderated, but it was still blowing very strong. I was out along the seashore and kept a watch for the Starlings. They rose from the island at 7.35 A.M., and with the wind at their back they came across at a record speed, travelling, according to my estimate, at 98.18 miles per hour. On the morning of the 19th November the wind blew almost a gale from the west, and I had an opportunity of ascertaining the rate of flight of the Starlings under adverse conditions, *i.e.* a head wind. They took 3 minutes 10 seconds to cross, equal to the rate of 28.47 miles per hour. Flying low, almost touching the water, they glided upwards when they reached the shore, passing directly over my head almost within reach of my hands.

On Saturday the 23rd November I visited the roost with Mr. Hogg, the farmer tenant. He confirmed my opinion that the number of Starlings frequenting the island this year was larger than at any time previous. It was about 4.30 when I reached the edge of the wood and the birds had nearly all arrived, but small flocks still continued to drop down. The entire plantation was simply alive with birds, and in the bright moonlight I could see them clustered close together on the trees. The whole body of Starlings kept up a continuous chatter, very pleasant to listen to, and which could be heard a long way off.

From the hamlet of Longgreen, which has been my

post of observation, Cramond Island lies to the east, and, measured on the Ordnance Survey maps, is distant almost exactly a mile and a half. This knowledge has enabled me to calculate with some approach to accuracy the speed attained by the Starlings in their morning flight on those occasions on which I have been so fortunate as to see them rise from the island.

Speed of Flight of Starlings.

Date. 1900	Rate of Flight. Actual Time.	Miles per Hour.	Direction of Wind.
Nov. 22	2 m. 25 sec.	37.24	South-west
Dec. 23	2 m. 30 sec.	36	Calm
„ 30	2 m. 5 sec.	43.20	Slight Easterly
„ 30	2 m.	45	„ „
1901			
Jan. 1	2 m.	45	Almost Calm
„ 5	2 m. 20 sec.	38.57	South-west
„ 6	1 m. 30 sec.	60	East
„ 13	2 m. 10 sec.	41.53	Variable (Southerly)
Feb. 2	1 m. 45 sec.	51.42	North-easterly
„ 5	2 m.	45	Calm
„ 7	2 m. 35 sec.	34.83	West
„ 11	2 m. 20 sec.	38.57	North
Oct. 17	2 m. 5 sec.	43.20	No wind.
„ 28	2 m. 25 sec.	37.24	West.
Nov. 13	55 sec.	98.18	Gale from East.
„ 19	3 m. 10 sec.	28.42	West (very strong).

ON THE OCCURRENCE OF THE CAROLINA CRAKE [*PORZANA CAROLINA* (LINN.)] IN THE ISLAND OF TIREE.

By Francis G. Gunnis.

On the 25th of October last my brother-in-law, Mr. E. Lort Philipps, while shooting snipe with me in Ronnach bog, at the west end of the Island of Tiree, Inner Hebrides, obtained a specimen of the Carolina Crake. This bird was examined by Dr. Bowdler Sharpe, and was exhibited by Mr. Lort Philipps at the meeting of the British Ornithologists' Club on the 26th November last. It was a young male which

had completed its first autumn moult, and was very fat—indeed I have seldom seen a bird in better condition, showing that it had been for some time either on the Island, or in some other locality well suited for its feeding habits. When on the wing it resembled a diminutive Landrail, with its laboured flight and hanging legs.

I believe this Crake has not hitherto been recorded for Scotland. As far as I can make out, it has been captured once near Newbury, in Berkshire, in October 1864 [Newton, "P. Z. S.," 1865, p. 196]; and again at Cardiff in the spring of 1888 ("Birds of Glamorganshire," p. 113).

[It is not at all improbable that this species has occurred on other occasions in the British Isles, but has hitherto escaped detection. It has a high northern breeding range in North America, moving south in the autumn as far as the West Indies and northern South America. In summer it is most abundant in the eastern portion of its range, and, according to Richardson ("Fauna Boreali Americana," 'Birds,' p. 403), it is common as far north as latitude 62°. In connection with its occurrence in Britain it is important to know that it has on several occasions been known to visit Greenland. Herr Winge, in his most useful contribution to the "Conspectus Faunæ Grœnlandicæ" ('Aves,' p. 146) records three occurrences—two for the autumn and one during summer. It is not necessary, therefore, to conclude that an extraordinary flight has been performed to reach our islands, for the passage to and from Greenland is annually made, probably by way of Iceland, by a considerable number of migratory species.—Eds.]

ON A SCOTTISH SPECIMEN OF THE BLACK-FISH [*CENTROLOPHUS NIGER* (GMELIN)].

By R. H. Traquair, M.D., LL.D., F.R.S.

Plate I.

During my absence from Edinburgh in August last, a fish, caught on the 21st of that month in a salmon net at Largo Bay, Firth of Forth, and presented to the Museum by Messrs.

CENTROLOPHUS NIGER (GMELIN).

Anderson and Sons, was identified by Mr. Eagle Clarke as a specimen of the Blackfish [*Centrolophus niger* (Gm.), *C. pompilus*, Cuv. and Val.].

The specimen was sent to be stuffed, so I did not have an opportunity of seeing it in a moist condition ; but as the taxidermist who mounted it (Mr. V. Knight), when dealing with fishes, always makes a plaster mould from his subject before skinning it, into which mould the skin is fitted for stuffing, the proportions, as given in Plate I., may be relied on as accurate. This figure represents the specimen on a scale of rather less than one-third natural size, and, to ensure accuracy, the outline has been traced from a photograph.

The entire length is $20\frac{1}{2}$ inches, the greatest depth at about the junction of the first and second thirds of the body is 5 inches, the general shape is elegantly fusiform, and tapering posteriorly. The length of the head from the tip of the rounded snout to the posterior margin of the operculum is contained more than five and a half times, the greatest depth of the body slightly over four times, in the total. The posterior extremity of the maxilla extends to just below the anterior margin of the orbit ; the teeth visible on the premaxilla are small, styliform, and in one row. The pectoral fin measures $1\frac{7}{8}$ inch, and is therefore only half as long as the head ; the length of the ventral is $1\frac{1}{4}$ inch. The length of the furcate caudal fin is contained six times in the total.

The long dorsal fin, commencing above the middle of the pectoral, contains 40 rays ; the anal, 23 ; the right pectoral, 21 ; and the left pectoral, 22. This formula corresponds with that given by Günther ("Cat. Fishes," Brit. Mus. vol. ii. p. 403), which is as follows :—D., 39-41 ; A., 23-25 ; P., 21.

The colour of the stuffed fish is a uniform dark brown, which most probably was nearly black when the specimen was fresh. The lateral line makes a wide curve over the region of the pectoral fin, and then passes gently down till it reaches the middle of the side in the caudal region ; the scales are very small in proporton to the size of the fish.

Although I entertain no doubt that the fish before us is the *Pompilus* of older writers, the Blackfish of Jago and Borlase, the *Perca nigra* of Gmelin, the *Centrolophus pompilus* of Cuvier and Valenciennes, it shows in its proportions some differences from the current descriptions and figures, which it may be as well to note.

The proportion of the length of the head to the total is given by Günther, Day,[1] and Jordan and Everman,[2] as one in five; here it is rather less than one in five and a half. The length of the pectoral fin is only half that of the head, while Day gives the proportion as two-thirds to one, and in his figure it is as much as three-fourths to one. The caudal is also shorter and smaller than in the figures given by Cuvier and Valenciennes, Day, and Jordan and Everman; in the last-mentioned figure, for instance, the length of the fin is nearly one-fourth of the total, while in our specimen it is only one-sixth. The rays of the dorsal and anal fins are also represented in Day's, as well as in Cuvier and Valenciennes' figure, as being proportionally much longer than in the present case.

The genus *Centrolophus* of Lacépède belongs to the family Stromateidæ, and of its species only two occur in British waters, namely, *C. niger* (Gmelin), and *C. Britannicus* (Günther). The habitat of the former, or Blackfish, the subject of the present notice, is given by Günther as—"Mediterranean, coasts of France, and south coasts of England." It has also occurred in Ireland, and Jordan and Everman mention one specimen as having been obtained at Dennis, Massachusetts. As a British fish it is undoubtedly very rare, and I know only of one previous record of its occurrence in Scotland, namely, a brief notice by the late Rev. Dr. Gordon of Birnie, in the "Zoologist" for 1852, p. 3459. Here, in a paper on the 'Fishes of the Moray Firth and in the Fresh Waters of the Province of Moray,' he notes:—

"The Black Fish, *Centrolophus Pompilus*. A single speci-

[1] "British Fishes," vol. i. p. 111, pl. xl., fig. 2.

[2] "Fishes of Middle and North America," vol. i., Washington, 1896, p. 963; vol. iv., 1900, pl. cxlix., fig. 403. The general form of the fish, as portrayed in this figure, is so different from that shown in other figures, as well as in the specimen here described, that the question arises in one's mind, Has it been taken from an individual of the same species?

men of this very rare fish was caught in a net at Lossiemouth in 1841. It measured 14 inches in length, and was almost wholly black. It proved an object of great curiosity to the fishermen and the sailors, who declared that they had never before seen so singular a fish (*Mr. Martin*)."

EXPLANATION OF PLATE I.

Outline of a specimen of the Blackfish [*Centrolophus niger* (Gmelin)] from Largo Bay, rather less than one-third natural size.

OCCURRENCE OF *CENTROPHORUS RINGENS* IN BRITISH WATERS

By GEORGE SIM, A.L.S.

A SPECIMEN of this shark, a female, 4½ feet long, was caught by line off Barra Head, Outer Hebrides, in August last, and was brought to Aberdeen market.

The species is common along the coast of Portugal, where it was first described by Bocage and Capello as *Scymnodon ringens*. This fish is distinguished from the other seven species of the same genus in the form of its teeth; by its scales, each of which have three high strong ribs on its surface; and by its possession of a strong, short, blunt spine in front of each dorsal fin. In general appearance it is somewhat like *Centrina salviani*; but is easily distinguished from that species in being plain along the sides, whereas *C. salviani* has a keel of skin along each side of the abdomen.

I have failed to find any previous record of this species for British waters, and shall be glad if any of your readers know of such.

NOTES ON SALMONIDÆ.

By J. A. Harvie-Brown.

The River Inver—West Coast.

I am now selecting for illustration a history of the above-named river. The rivers Inver and Kirkaig I have known for many years intimately, from their sources to the sea. I have known them since before the late Duke began his restocking operations on the Inver, and I have fished one of the two rivers at least—the Inver—since 1866, and the other also for many years.

As shortly as I can, I will give a sketch of the history of these rivers down to the present time.

Now, although the Royal Commissioners of 1862 "fixed for ever" the very contracted estuarial limits of the rivers Inver and Kirkaig, and though they treated their drainage areas as constituting two distinct districts, fortunately wiser heads of the Estates Management, having full rights, extended the estuarial line to include the two rivers as one district, making the northern limit at Clach-toll in Stoir, and drawing the line outside the island of Soay, which lies off the entrance of Loch Inver, to a point three miles to the south of the village of Inverkirkaig, which is situate at the mouth of the river Kirkaig. Within this line no nets are permitted. This gives a free estuary to both rivers of the length of some six miles between the points, and of two and a half miles from shore. Only in very dry seasons of the summer runs of fish, do the shoals get severely punished by the nets outside. These rivers, therefore, have good chances of periodical recoveries. The years 1887 and 1888, and again 1901, were great years of extreme drought.

The Inver has a course of some seven miles after flowing out of Loch Assynt. Loch Assynt is seven miles long, and receives at its extreme head the combined waters of the Loanan River and those of the limestone burns of Trailigil and Altnaoul, branches of which crystal streams flow by underground passages from the Muloch Corrie, or

Gillaroo Loch, and from the great limestone plateau between that loch and the high limestone cliffs of Stronchrubie.

The main stream of the Loanan is four miles in length, after leaving the famous trouting waters of Loch Awe of Assynt. It receives another limestone burn which is composed of one great spring gushing out of the huge limestone plateau and cliffs of Stronchrubie, and appropriately known as the Cold Spring, or Altnaoul Burn, and also the Trailigill Burn, close to Loch Assynt.

Loch Awe is a shallow sheet of water about one mile and a quarter in length, and in it a few salmon are occasionally got in some seasons. Entering it is a short stream of, say, 150 yards in length, running over a continuously rough bed, with no resting pools or lies for fish; and this flows out of a little loch called Loch Gruagach, which may cover about 20 acres. On the shore of this little loch, close to the outlet, two salmon have been killed with fly in one day by the late John Sutherland, gamekeeper to the Duke for many years, and afterwards innkeeper since 1865 at Inchnadamph. [I believe I was the first guest he had in that inn, unless the honour was divided by two other friends.] Such is a description of the drainage basin of the Inver River, but I ought to add that there are several other tributaries which flow into it both below the exit from Loch Assynt, and from the limestone district of Achumore into Loch Assynt, opposite the embouchures of which are often favourite salmon lies.

Previous to the year 1872, in which fresh ova of salmon were introduced to the upper waters, and for many years afterwards, the principal known lies for salmon in the loch occupied a stretch of shore from a little lower down the east and north shore than the burn of Skiag, up to the bay of the main affluent at the top of the loch. But of later years, and since the introduction of the fresh fish ova and alevins, mostly from the Thurso River, the extent of salmon ground has been very considerably extended, and now stretches along the opposite shore to and beyond the prominent point of Rhu na Moin.

The river is (has been hitherto) divided into two beats, each beat for two rods only, and in the interests of the

upkeep of the river and its true sporting abilities it is to be hoped that no increase upon that number will ever be made. Greed may do so some day, but greed, if it does, will some day have its reward. It will be for the Estate Managers to see to this in the future.

Commencing at the sea, the pools of Inver are as follows :—

Lower Inver.

Sea pool.	Old Cruive ; rarely fished.
Carpenter's pool, and a cast called the Claraig.	Pollochie.
Rockie.	Scrambles.
Little Rockie.	Capt. Turner's pool (?) or "Turn-pool."
Mill pool and Claraig.	Red pool Claraig.
Hog's Back and several "wee placies" above.	Red pool.
Ladder.	Island pool.
Gravestone.	Dyke pool.
Pollen.	Whirl pool.
	Long pool.

And here endeth the lower half of the Inver.

Continuing the naming of the pools of the Upper Inver, as we ascend these are as follows :—

Upper Inver.

Brackloch pool (a dead pool wanting much wind, and famous for kelts).	Neck of the Narrows, and a cunning corner below.
Deer pool.	Lower Grassy.
(A cast.)	Upper Grassy.
Washing pool.	Glynn Burn cast.
Minister's pool.	Lochan Neaski (three streams running into a loch, or widening of the river.
Bridge pool.	Bridge pool, and a good cast above it.
Black pool.	Lochan Garbhie.
The Narrows, which comprise some five good casts between the Black pool and the next named.	

The above I believe to be a full list of all the real pools of the river.

I fished the Upper Inver first in 1865, and at that time the pools were pointed out to me and the lies of the fish,

and how to manipulate some rather intricate "placies," by John Sutherland (than whom there was none knew better how). Fish ran earlier in the season then, but a difference in this respect very soon began to show after a considerable increase in the number and length of the Clachtoll nets took place. On the 11th of June 1867 I well remember a particularly lovely basket I made on the Upper Inver—all with a blue salmon fly. It was as follows: a fresh-run salmon of 16 lbs., a fresh grilse of 6 lbs.,[1] a brown trout of 4 lbs., another of $2\frac{1}{2}$ lbs., and three 1 lb. trouts. On the same day my friend, W. H. Jesse, killed on the trout-reaches above, thirty-five trout weighing 40 lbs. Not many salmon are now killed I fancy in June or May; indeed it is seldom fished except for trout.

In those days our fishing was by permission of the Duke's factor, and my friends and myself used to have as much of it as we cared for. But we had other objects in view at that time, so did not use our opportunities as fully as we might have done. Our principal objects in those days were in the naturalist's line—collecting birds and birds' eggs. My first introduction to Assynt was by my good friend, Dr. H. H. Almond, to whom I hope I am *for ever* grateful. For several years he and I fished there together, and later both he and I took the fishings of the rivers Kirkaig and Inver, independently, however, of one another. Before then he and I were, during two seasons, presented with the fishings of the Upper Inver, which in those days went with the shootings of Inchnadamph, in the first instance by the brothers Moncrieff, who cared only for the deer-stalking and shooting; and in the second and succeeding year by three gentlemen, Scott, Wells, and King, who also preferred the "fery deer themselves." Then Mr. Whitbread took the Assynt shootings on a lease, and for many years sublet the Inver to our party of four. We also secured the Kirkaig, the sister-river, and we fished the two from Lochinver Hotel, and at times from Inchnadamph.

From about the date of 1872 the first new ova were

[1] A very early date for *grilse*, November 1901. I *suspect* it was a small salmon.

introduced by the Duke and reared in a small house placed upon a tiny limestone stream which issues from the limestone cliff of Stronchrubie and loses itself in the greater Loanan. This proved eminently successful, and had been continued down to about 1882 with good results. The fish for the most part were procured from the earlier spawning fish of the rivers Thurso and Brora, and in one season from the Tweed. Though done on quite a simple plan, with no glass grills or carefully-graded hatching-houses, there are patent—very patent—results to be seen of later years, as I have already indicated. It seems a pity that this admirable success has not been followed up since 1882. The ruins of the old hatching-house are still to be seen.

The person who has been in charge of these hatchery operations—John Munro, the Duke's gamekeeper at Inchnadamph—at my request, supplies the following details :—"The year in which the first hatching-off took place was 1872, so far as I recollect. The ova was obtained for a series of years from the Thurso and Brora, and one year they were brought from the Tweed. When the hatchery was fully stocked, I used to turn some 60,000 to 70,000 annually into the Loanan, and so to the Inver, and some, as an experiment, into the Kirkaig ; and some years I turned in more. I also put some into the burn which flows from the Glen Glynne loch."[1]

"The most of the fish whilst passing up or resting in Loch Assynt keep to the north shore, *i.e.* along the roadside between Inchnadamph and Loch Inver, but some are now got also on the south side.[2]

"I cannot rightly say whether the rivers are now earlier than formerly. I do not think they have yet become so, but certainly the fish are better shaped, and I think they have crossed with the old Inver fish. As a rule we do not have the grilses up much before the 8th of June, but I have no doubt the salmon come up in April, although they are not fished for much at that time." (Those I consider the later runs of the *true* season.)

[1] I have made inquiries, in 1901, when present on the spot, but I cannot find that any fish spawn on this burn.

[2] I cannot help thinking this south shore is not credited sufficiently by gillies or anglers.

As regards the upper waters, Munro says, "Loch Awe is much about the same as formerly, *i.e.* about the same as regards its capabilities as a trouting sheet of water, but Loch Gruagach is very little fished, and I can say but little about it. I am of the opinion that the trout are not so plentiful (*i.e.* generally) as they were when I came here first." Munro came to Inchnadamph, I think, the same year that Mr. John Sutherland took up innkeeping at Inchnadamph, and one year before I first visited that delightful place, viz. in 1865.

Desiring some more exact particulars, I asked a series of questions to be answered by Mr. Wallace, who has had the fishings of the Upper Inver since 1894. The following statements are the results :—

The proportion of the short, thick salmon and grilses now killed is, I believe, more than half the total number taken.

The fish taken on the south side of the loch are the new fish.

Both varieties, and also what seems a cross, are got on the north side.

I am sorry I cannot give you the details as to the number of J. Munro's grilses, but I herewith send a list of the takes since 1894.

The distinct improvement in the quality of the salmon was just beginning to show itself when I first came here in 1894. A few were killed yearly before that time, but no appreciable improvement was evident till about six or seven years ago.

The old fish seem now to be rapidly disappearing. An occasional salmon is got in the Trailigil River, but as yet there has been no trace of fish in the Lochan Glynne burns (*i.e.* the burn which joins the Inver below Lochan Neaski).

N.B.—I have added the list of fish obtained since 1894 to my records, going back to 1865. Of course Mr. Wallace's score relates to fish killed both on the Inver and on Loch Assynt, but my older fishings refer for the most part to the Inver, Upper and Lower. I do not give all these statistics here, as that would be a little out of place; but I may mention that two rods on the Inver used to get from thirty to fifty fish in the month of July. One season we got forty-nine fish, but tried in vain to kill the fiftieth one. This was in the early days of August, when short rising was the order of the day. The river was full of fish, and many were risen, pricked, and light-hooked. I shall have

more to say about this phenomenon later in this series of papers, as a continuation of this history of the Inver River. And later I shall have something to say of habits—as observed by me—of River Inver fish, "fossacks" (or tidal trout) and sea trout.

Up to this point I have kept simply to a history of the river as known to me. I visited Inchnadamph again in June 1901, and learned upon the spot information which verified what has been said above. Before the two or three days of rain which we had within the drainage area of the Inver, which took place upon the 11th, 12th, and 13th of the month, I had on several occasions taken the temperature of the Loch near the surface. I found it was, as taken by me, $49\frac{1}{2}$° Fah., and it was much colder than the air. Both my boatmen whom I employed expressed themselves as never remembering the water of Assynt so cold at this time of the year as thus in June 1901. At this time the loch was at perhaps the lowest level since 1887 and 1888. These temperature readings were taken along the side of the loch next to the road, which is the water most frequented by fresh-run salmon; and as that is superintended along the whole area of shore by the limestone of Achumore, and above the loch by limestone cliffs of Stronchrubie, of the limestone and granite of Trailigill, and of the limestone of Altnaoul, the deep-seated cause of these low temperatures does not appear hard to understand.

And to emphasise this I found also that the waters of Loch Awe of Assynt, already spoken of, the May-fly—true green and gray drakes, but seemingly smaller than normal —appeared eight days earlier than usual. The first "show up" was upon 28th May (only a few), and then in thousands (*sic*) afterwards. The loch being muddy, the trout were not rising freely at them. At this time, however, the Loch Awe trout were in excellent condition, as they are usually the first to get into form of all the loch trout of Assynt.

Loch Assynt is a deep and extensive loch, fed principally by limestone water coming from very deep sources; but Loch Awe is a shallow loch of small size, fed mostly from surface water off the gneiss of Canisp until the effluent river Loanan is joined below by the Cold Spring burn from the limestone

of Altnaoul, and by the minor small ditch-like stream where the late Duke's hatching-house was situated.

There may be nothing new in these notes that throw much light upon our darkness, but I think they may possibly help if compared with notes from other rivers.[1]

NOTES ON FRESH AND BRACKISH-WATER ENTOMOSTRACA FOUND IN ABERDEENSHIRE.

By Thomas Scott, F.L.S.

The Entomostraca recorded in the following notes were collected chiefly in the vicinity of the river Ythan, from a short distance above the railway viaduct at Ellon to a little beyond the point where the river is joined by the Burn of Forvie. But in addition to the species obtained here, I am enabled, through the kindness of Mr. R. M. Clark, B.Sc., F.L.S., to record three species from another district, two of which are new to the Entomostracan fauna of Aberdeenshire; these are separately described at the end of this paper.

I had two reasons for selecting for examination the part of the Ythan referred to above. First, because of its being within easy reach of Aberdeen, and, second, because the lower portion of the river, being a tidal estuary, was likely to yield a number of brackish-water Entomostraca, which are always interesting since they form a kind of borderland where the true fresh-water species are found merging into those that are truly marine.

[1] Amongst other evidence offered at a meeting of the Commissioners of the United States and Canada, Mr. Wm. Murray is reported to have said that "the results of his investigations went to prove that artificial culture did not lead to any improvement of the fisheries of the United States or Canada.

Of the river I have just spoken of, I do not think the same can be held true. But all these divergent evidences given as the natural state in different river-systems only proves that history of these rivers has still to be more carefully worked out than it has been before, if we are to expect tangible results for more general conclusions. But again, Mr. Henry Ffennel also condemns artificial rearing, whilst Bickerdyke as strenuously upholds it.

I may add, Loch Assynt is particularly subject, and sensitive to, aeration by westerly winds, whilst Loch Awe is less so, but in very moderate winds becomes muddy, from its shallowness and long weeds stirring up the bottom.

Three visits were made to this part of the Ythan during the past summer, twice in July and once in August, and the results, briefly set forth in the sequel, were fairly satisfactory.

The bridge which spans the river at the village of Ellon is said to be the limit to which the influence of the tide extends, but it is not till one gets below Waterton that any difference in the Entomostracan fauna of the river begins to be observed. It may be stated further that the river for some distance both to the east and the west of the bridge does not present conditions very favourable to Entomostracan life; it is only when we get beyond the railway viaduct on the one hand and below Waterton on the other that good hunting ground is met with. A little above the viaduct the land bordering the Ythan on the south side assumes the form of a flat, low-lying meadow, and here, there is what looks like part of an old bed of the river, and through which the water may still find a channel when in flood. I visited this place on 13th July, and at that time this old channel had practically no connection with the river except at its lower end, and the water it contained, being undisturbed, seemed to be a very suitable habitat, and, along with a few other places in the neighbourhood, yielded no fewer than forty-two species of these minute crustaceans. It was noticeable, however, that though there was great variety, the individuals of each kind were comparatively few; it was in marked contrast to what is sometimes observed in lochs and ponds, where myriads of individuals will sometimes be met with, but with very little variety as regards species. Several of the species obtained have not before been recorded for the county. The part of the river examined in August was the north shore, from about half-way down the Waterside Road to a little beyond the confluence of the Burn of Forvie. Near the ferry, between Denhead and the Kirkton of Logie-Buchan, is a considerable amount of marshy ground, intersected by a burn and a few ditches. Here some moderately rare fresh-water species were found, while near and beyond the mouth of the Forvie several interesting brackish-water Copepoda and Ostracoda were collected. The number of species obtained on this occasion was thirty-nine, only two of which belonged

to the Cladocera, while the remainder was about equally divided between the two groups mentioned above.

A small portion of the north shore bordering the Water-side Road had been examined during an earlier visit, viz. on 6th July, when about twenty species of Entomostraca were obtained, five of which were not observed in August. On 6th July the tide was flowing, and while watching the gradual and steady advance of the water upon the land, I noticed myriads of Schizopods crowding up with the advancing water, all of which appeared to be eagerly seeking for and catching the minute organisms that were being stirred into activity by the incoming tide. A single dip of the hand net was sufficient to capture a considerable number of these busy crustaceans, and when examined at close quarters they were found to consist entirely of *Neomysis vulgaris* (J. V. Thompson). Lower down the river, where the conditions become more estuarine, there are forests of tall reeds growing along the river side; here in pools in the mud the curious amphipod *Corophium grossipes* was obtained.

The total number of Entomostracan species captured during my three visits to the Ythan is sixty-five, seventeen of them belonging to the Cladocera, twenty-six to the Ostracoda, and twenty-two to the Copepoda. Included amongst these were seven species of the Ostracoda and six of Copepoda which are more or less decidedly brackish-water forms.

The following are the names of the species captured on these three occasions, their abundance or rarity being indicated by the following abbreviations — c. = common, n.c. = not very common, r. = rare, and v.r. = very rare; a blank, that it was not obtained at that particular visit, and an * is placed opposite the names of the brackish-water species.

CLADOCERA.

	1st Visit, July 6.	2nd Visit, July 13.	3rd Visit, Aug. 24.
Ceriodaphnia quadrangula, Müller		n.c.	
Scapholeberis mucronatus, Müller		n.c.	
Simocephalus vetulus, Müller		c.	
Daphnia longispina, Leydig		n.c.	
Bosmina longirostris (Müller)		c.	
Ilyocryptus sordidus (Lieven)	c.	c.	c.

CLADOCERA—*continued.*

	1st Visit, July 6.	2nd Visit, July 13.	3rd Visit, Aug. 24.
Eurycercus lamellatus (Müller) . . .		c.	
Acroperus harpæ, Baird		n.c.	
Lynceus (*Alona*) *guttatus* (G. O. Sars) . .		n.c.	
„ „ *quadrangularis* (Müller) .		n.c.	
„ „ *affinis*, Leydig . . .	n.c.	n.c.	n.c.
„ „ *rusticus* (T. Scott) . .		v.r.	
„ „ *rectangularis*, G. O. Sars .	r.	r.	
Pleuroxus trigonellus (Müller) . . .		n.c.	
„ *uncinatus*, Baird . . .		n.c.	
Peratacantha (*Peracantha*) *truncata*, Müller .		n.c.	
Chydorus sphæricus, Müller . . .	c.	c.	

With the exception of *Ceriodaphnia quadrangula* and *Lynceus* (*Alona*) *rectangularis*, the species enumerated have already been recorded for Aberdeenshire, but not from the district under consideration. *Ceriodaphnia quadrangula* appears to be somewhat of a local species and not very common ; *Lynceus* (or *Alona*) *rectangularis* is sometimes not uncommon in pools near the sea where the water is slightly brackish, and has been obtained not only in the vicinity of the river Ythan, but also on the Links at Aberdeen.

I may mention that in the large recently published work on the Cladocera of Sweden by Prof. W. Lilljeborg,[1] the name *Alona* of Baird is set aside in favour of *Lynceus* of Müller. The genus *Lynceus*, instituted by Müller in 1776, came in course of time to include forms that differed so considerably from one another that a revision and rearrangement of the species it contained became more and more urgent. Dr. Baird took the work in hand, and one has only to read his "Natural History of the British Entomostraca" to see how thoroughly it was done. He broke up the old genus into a number of genera, but the name which Müller had instituted was not given to any of them, yet, curiously enough, he reserved the name Lynceidæ for the family. In Lilljeborg's work Müller's name *Lynceus* is restored for that group of species to which Baird gave the name of *Alona*.

I may also state that Lilljeborg has altered Baird's name *Peracantha* to *Peratacantha*.

OSTRACODA.

	1st Visit, July 6.	2nd Visit, July 13.	3rd Visit, Aug. 24.
Cypria ophthalmica (Jurine) . . .	c.	c.	c.
Cyclocypris serena (Koch)	c.		c.
„ *lævis* (Müller)		n.c.	

[1] "Cladocera Sueciæ," von Prof. W. Lilljeborg [Nova Acta Regiæ Societatis Scientiarum Upsalensis, Ser. Tertiæ, vol. xix. (1901)].

OSTRACODA—*continued.*

	1st Visit, July 6.	2nd Visit, July 13.	3rd Visit, Aug. 24.
Cyclocypris globosa (G. O. Sars)		n.c.	n.c.
Cypris obliqua, Brady		r.	
Herpetocypris reptans (Baird)		n.c.	v.r.
,, *tumefacta* (Brady and Robertson)	n.c.	n.c.	
Ilyodromus robertsoni, Brady and Norman		v.r.	
Cypridopsis villosa (Jurine)	n.c.	n.c.	n.c.
Pionocypris vidua (Müller)	n.c.	r.	
Potamocypris fulva, Brady			n.c.
Candona candida (Müller)	c.	c.[1]	c.
,, *lactea*, Baird			c.
,, *rostrata*, Brady and Norman		n.c.	n.c.
,, *fabæformis* (Fischer)		r.	
,, *hyalina*, Brady and Robertson		n.c.	n.c.
,, *acuminata*, Fischer			v.r.[2]
Candonopsis kingsleii (Brady and Robertson)			r.
* *Cythere pellucida*, Baird	n.c.		c.
* ,, *macallana*, Brady and Robertson			n.c.
* ,, *gibbosa*, Brady and Robertson			c.
Limnicythere inopinata (Baird)	c.		c.
* *Cytheridea torosa* (Jones)			c.
* *Cytherura gibba* (Müller)			c.
* *Sclerochilus contortus* (Norman)			n.c.
* *Cytherois fischeri* (G. O. Sars)			n.c.

Several of the species in this list have not previously been recorded for Aberdeenshire, and nowhere else in the county have I found the genus *Candona* so well represented. The species marked with an * are inhabitants of brackish water, a few of them being also found in the sea within the littoral zone.

COPEPODA.

	1st Visit, July 6.	2nd Visit, July 13.	3rd Visit, Aug. 24.
Cyclops vernalis, Fischer			n.c.
,, *bisetosus*, Rehberg	n.c.		n.c.
,, *viridis* (Jurine)		n.c.	
,, *albidus* (Jurine)		n.c.	
,, *serrulatus*, Fischer	c.	c.	n.c.
,, *affinis*, G. O. Sars		n.c.	
,, *fimbriatus*, Fischer	n.c.	n.c.	
* *Tachidius littoralis*, Poppe			c.

[1] Males and females were obtained. I counted twenty-one or twenty-two ova in one of these females.

[2] The male only of this species was observed.

COPEPODA—*continued.*

	1st Visit, July 6.	2nd Visit, July 13.	3rd Visit, Aug. 24.
**Delavalia palustris*, Brady			n.c.
Canthocamptus staphylinus (Jurine)	n.c.	c.	c.
„ *minutus*, Claus	n.c.	n.c.	n.c.
„ *inornatus*, T. Scott	r.	n.c.	n.c.
„ *hirticornis*, T. Scott			c.
„ *crassus*, G. O. Sars	n.c.	c.	n.c.
„ *pygmæus*, G. O. Sars	n.c.	c.	n.c.
„ *zschokkei*, Schmeil		r.	n.c.
Moraria anderson-smithi, T. and A. Scott			n.c.
„ *poppei* (Urazek)		n.c.	
**Laophonte curticauda*, Boeck			n.c.
**Nannopus palustris*, Brady			n.c.
**Platychelipus littoralis*, Brady			n.c.
**Dactylopus tisboides*, Claus			n.c.

The species marked thus (*), though occasionally found in the open sea, are usually more frequent in pools and estuaries where there is a large admixture of fresh water. The following remarks on some of the species may be of interest :—

Tachidius littoralis was described and figured in part iii. of the "Tenth Annual Report of the Fishery Board for Scotland," 1892, as a new species under the name of *Tachidius crassicornis*, but I subsequently learned that it had been described by Dr. S. A. Poppe in 1881 under the name which it now bears. It is readily distinguished from *Tachidius brevicornis* (Müll.) by the short stout antennules, which terminate so abruptly that they look as if their ends had been snipped off; the fifth thoracic feet are also narrow and quite unlike the two big, almost semicircular plates that form the fifth feet of *T. brevicornis*.

Canthocamptus minutus is a small species, and apparently widely distributed. When viewed laterally, the principal tail setæ seem to spring from beneath the overlapping short furcal joints; from above, the minute bristles that fringe the anal operculum are bifid, and by these two characters alone the species may be distinguished.

Canthocamptus inornatus was first observed in Rescobie Loch, Forfarshire, and has since been found in various other parts of Scotland and also in England. This species may be distinguished by the moderately long and tapering furcal stylets.

Canthocamptus hirticornis is found most frequently in pools and lochans near the sea coast, but not necessarily in brackish water.

Canthocamptus zschokkei.[1]—This so closely resembles *C. pygmæus*, that it may easily be mistaken for that species. There are two characters, however, by which the females of both may usually be distinguished; in the former the long setæ of the first four pairs of thoracic feet are straight; in the latter the long setæ of the fourth pair are distinctly curved at the ends; in the first the anal operculum projects upwards at an acute angle; in the latter the operculum is depressed. These peculiarities are best seen when the specimens are viewed laterally. *C. zschokkei* was described and figured in part iii. of the "Eleventh Annual Report of the Fishery Board for Scotland," 1893, under the name of *Attheyella propinqua*.

Moraria poppei.—This is one of the rarer fresh-water Harpactids of Scotland. Hitherto I have observed it in only two localities, namely, in pools by the side of Loch Fad in Bute, and near the shore at Hunterston, Ayrshire; this is therefore the first time it has been recorded for the east of Scotland. It is a very small species and requires careful examination. A third species of *Moraria—M. brevipes*, G. O. Sars—has been recorded from several places in Scotland, and among others in Rescobie Loch, Forfarshire.

Laophonte curticauda.—This *Laophonte* is not so frequently met with in brackish water as one or two others of the same genus, such as *Laophonte mohammed*, Richard, which was discovered in brackish-water pools near Langbank, Renfrewshire, in 1897,[2] but which had previously been observed by Mr. Scourfield in a marsh at Barmouth Junction, North Wales, in November 1895. *Laophonte littorale*, T. and A. Scott, another brackish-water species, has been found near Aberlady, Firth of Forth, and at the mouth of the river Alness, Cromarty Firth.[3]

Nannopus palustris and *Platychelipus littoralis* are two curious brackish and estuarine species described by Dr. G. S. Brady in his "Monograph of British Copepoda." Formerly they were considered to be moderately rare, but the extended research of recent years has shown their distribution to be fairly extensive.

Dactylopus tisboides.—As pointed out by Dr. Brady, there appear to be two forms (or races) of this species—a brackish-water and a marine; that found in the Ythan belongs to the first, and is not

[1] The two species mentioned here (*C. zschokkei* and *C. pygmæa*) should perhaps be more correctly referred to the genus *Attheyella* of Dr. G. S. Brady, as they differ from the typical *Canthocamptus* in the structure of the first pair of thoracic feet.

[2] Part iii. of the "Fifteenth Annual Report of the Fishery Board for Scotland," p. 317.

[3] "Ann. and Mag. Nat. Hist." (6), vol. xii. p. 238, pl. xi. figs. 7-14 (October 1893).

uncommon between tide-marks, and I have found it in rock pools above high water.

In the study of these, as of many other organisms, it is found that when one tries to limit his observations to the so-called "freshwater" or to the "marine" species, the barrier set up between the two has to be more or less an arbitrary one, it being practically impossible to draw a line that will enable him to say "all on this side belong to the freshwater group and all on that to the marine." We have in these brackish waters a kind of "no man's land," where the organisms of the sea and of the fresh water appear as if engaged in a perpetual struggle for the invasion of each other's domain. Take, for example, the *Neomysis* already referred to. This Schizopod is found in the Firth of Forth, in the Moray Firth, and elsewhere in water that differs little from typical sea-water, and it belongs to a group of crustacea whose habitat is decidedly marine, yet this species has been found in lochs such as Loch Wester in Caithnessshire, and Sinclair Loch in the Island of Barra in water which was quite fresh. On the other hand, we have *Cyclops bicuspidatus*—a typical fresh-water Copepod with 17-jointed antennules—represented in brackish-water pools by a form whose only apparent difference is that its antennules are 14-jointed, the difference being brought about by three joints having become coalescent with those next to them. This variety (var. *lubbockii*, Brady) is found associated with *Cyclops bisetosus* (another fresh-water *Cyclops*), *Delavalia palustris*, *Canthocamptus palustris*, *Eurytemora velox*, and others. Then again we have *Cyclocypris serena*, and *Candona candida*, so common in our fresh-water lochs and ponds, sharing the same pools with *Cythere pellucida*, *Cythere gibbosa*, and *Cytheridea torosa*, which are all more or less typical brackish-water species. It will thus be seen that this "borderland" presents a most interesting field for investigation.

For the following species I am indebted to Mr. R. M. Clark, B.Sc., F.L.S., who obtained them in a shallow pool near Millden, about six or seven miles north of Aberdeen, and not far from the sea. The names of the species are as follows:—

Diaptomus castor (*Jurine*).—Mr. Clark found this large and well-marked species moderately common in the pool referred to, and its occurrence there is all the more interesting from the fact that, so far as known to me, this is only the third time the species has with certainty been recorded from Scotland. In the "Annals of Scottish Natural History" for July 1892, p. 202, I have a note on its occurrence in the Braid Ponds near Edinburgh, but the place where these ponds existed has in recent years been greatly altered, and this Diaptomid is now probably extinct. The second was observed in a gathering of fresh-water Entomostraca collected in Helliers Water, Unst, Shetland, on 22nd June 1897, and sent to me by Mr. Robert

Duthie, Fishery Officer.[1] *Diaptomus castor* has been recorded from several parts of England.[2]

Cypris reticulata (*Zaddach*).—This species, which was also moderately common, has not before been recorded for Aberdeenshire. Considerable numbers of the same species have also been obtained by Mr. Clark in Corbie Loch.

Cypris virens (*Jurine*).—A few fine specimens of this species were observed in the same pool with the other two.

It may be noted in conclusion that in the present paper over a dozen species of Entomostraca, exclusive of brackish-water forms, are apparently new records for the county.

SAGINA NIVALIS (LINDBL.), FR.

By P. Ewing, F.L.S.

Sagina nivalis (Lindbl.) Fries, "Nov. Fl. Suec. Mant.," iii., p. 31 (1842).

Spergula saginoides, b. nivalis, Lindbl., in "Physiogr. Sallisk. Tidskr." p. 328 (1837-38), et in "Flora," xxiv., p. 587 (1841).

S. intermedia, Fenzl, in "Ledeb. Fl. ross.," i., p. 339 (1842).

S. nivalis, b. laxa, Lindblom, in "Bot. Notis.," 1845, p. 66.

b. cæspitosa (J. Vahl), Nordst., in "Bot. Notis.," 1880, p. 151.

Arenaria cæspitosa, J. Vahl, in "Fl. Dan.," Fasc. xxxix., tab. 2289 (1840).

Spergula cæspitosa, J. Vahl, *l.c.*, in corrig. (1840).

Sagina nivalis, a. congesta, Lindblom, in "Bot. Notis.," 1845, p. 66.

Sagina cæspitosa, Lange, "Pl. Grœnl.," p. 138; "Consp. Fl. Grœnl.," i., p. 22.

Mr. Bennett's note regarding this plant in the October issue is very interesting; and now that he has taken up the

[1] "Sixteenth Annual Report of the Fishery Board for Scotland," part iii. p. 259 (1898).

[2] Revision of the British species of Cyclopidæ and Calanidæ, by Dr. G. S. Brady, "Nat. Hist. Trans. Northumb. and Durham," vol. xi. p. 94 (1891).

subject, it is to be hoped that the place of these hill-forms of Sagina will be put on a more satisfactory basis. As my name has been mentioned by Mr. Bennett in his note, will you kindly allow me to add a few observations as a slight contribution to the subject under discussion?

With reference to the plant mentioned as having been gathered by Mr. J. Backhouse on Glas Mhol in 1847, I am not at all sure that it is not a form of *S. nivalis*. There is a specimen in the British Herbarium, Edinburgh, collected by Mr. F. M. Webb on Ben Lawers, 20th July 1877, apparently from the station for *Arenaria rubella* in the western ravine, which specimen, judging from its loose habit and the broad leaves forming the barren rosette, has very much the appearance of a plant that has been growing on loose soil, such as that at the edge of the stream on Glas Mhol, where, indeed, a plant almost identical in appearance to this is to be found.

Professor Babington, in the "Journal of Botany," vol. 2, pp. 340-342, describes the plant (*S. nivalis*); but it is quite apparent that the material at his command was too scanty to form the basis for a satisfactory definition. Had he examined the six specimens gathered by Professor Balfour in 1864, now in the Brit. Herb., Edinburgh, I am convinced he would have modified his description considerably. In the case of plants grown on the Breadalbane range, and also on specimens from Norway, there appears to be a central stem or rosette of larger leaves, and this is clearly seen on some of the plants on the sheets of the Brit. Herb., Edin., on my own specimens from Perthshire, and on about a dozen of those I brought from the Dovrefjeld this year. As to whether the plant is of lax or cæspitose habit seems to depend entirely on its stage of developement and age, and on the situation in which it is found. This is very clearly shown on the six specimens above referred to as having been collected by Professor Balfour in 1864. The peduncles are always very short and curved before flowering (*S. cæspitosa*, Vahl (?)); but, as in most other Arctic species, the peduncle develops rapidly and stands erect after flowering. Pentamerous flowers may be found, but the great majority of those I have examined are 4-partite. In other respects

Professor Babington's remarks agree with my own observations. I note that M. N. and A. Blytt, in "Norges Flora," state "Blomsterne 5-delelige," also that in Hooker's "Students' Flora," Ed. 3, 1884, it is made a sub-species of *Linnæi*, with flowers 5- rarely 4-merous. All appear to have followed Fries, who seems to have described a 5-partite flower. I have over forty specimens before me as I write, half of which (from the Brit. Herb., Edin.) were very kindly shown me for purposes of comparison by Professor Bayley Balfour, M.D., to whom I feel much indebted for the privilege; the others are from various stations in our own Highlands, as well as from the Dovrefjeld, Norway, and I cannot detect a hair of any kind on one of them.

Professor Babington remarks that, in Norway and on Ben Lawers, *S. nivalis* seems to grow at great elevations. In my experience the various heights for the Scottish plants vary from 2500 feet on Craig-an-Lochain to 3250 feet on Ben Lawers; while near Kongsvold on the Dovrefjeld it occurred at an elevation of about 4000 feet.

I think Mr. Bennett, in asking botanists to re-gather this plant, was quite justified in saying "if possible," as this is one of the rarest of our alpine plants, though I have gathered it all along the Breadalbane range from Ben Lawers to Chreag Mhor at the head of Glen Lochay. For obvious reasons I do not care to state distinctly the stations for it presently known to me; but as it may interest many botanists to know where Professor Balfour first found it, and where small plants are to be got even now, I may say it was about 50 feet above the saddle-back between Ben Lawers and Meal Garbh, as you ascend Ben Lawers from the Lochain-a-Chait side—the only station, so far as I am aware, known to Dr. Buchanan White for it. The plant, like many more of our Arctic species, is dying out, and only very small plants are to be seen now. I do not think there is the least chance of collecting one of these large plants that were often met with twenty years ago.

The subject is one which merits some attention; and it seems to me that, if Mr. Bennett can afford the time, he would find it interesting to study the various forms of Sagina occurring in the Breadalbane district, more especially those

found in the western ravine of Ben Lawers. For instance, I am not aware that any definite statement has been made in recent years as to whether that long-peduncled form of *S. Linnæi* is *S. subulata*, Presl., as Professor Balfour suspected, or not.

RECORDS OF SCOTTISH PLANTS FOR 1901, ADDITIONAL TO WATSON'S "TOPOGRAPHICAL BOTANY," 2nd Ed. (1883).

By Arthur Bennett, F.L.S.

The abbreviations, etc., are the same as in former records, viz. "Ann. S. N. H." = "Annals of Scottish Natural History"; "J. B." = "Journal of Botany"; *sp.* denotes that a specimen was sent me.

74. Wigton.

(All by *J. McAndrew, sps.*)

Nepeta Cataria.
Rumex Hydrolapathum.
Epipactis latifolia.

(All by *Rev. W. Moyle Rogers.*)

Rubus plicatus } *confirmed.*
R. rhamnifolius }
R. rusticanus.
R. raduloides.
Rubus hystrix.
R. Schlechtendalii.
R. pyramidalis.

75. Ayr.

(All by *Rev. W. Moyle Rogers.*)

Pilygala oxyptera.
P. serpyllacea.
Rubus plicatus.
R. Rogersii.
R. Lindleianus.
R. rhamnifolius.
R. Scheutzii.
R. pulcherrimus.
R. Lindebergii.
R. Selmeri.
R. rusticanus.
R. pyramidalis.
R. melanoxylon.
Rubus infestus.
R. radula.
R. dasyphyllus.
R. corylifolius, *var.* sublustris.
R. „ *var.* cyclophyllus.
R. cæsius.
Rosa glauca, *var.* subcristata.
R. canina, *var.* dumalis, lutetiana and urbica.
R. arvensis, perhaps introduced.
Epilobium obscurum.
Betula verrucosa.
Carex Goodenovii.

76. Renfrew.

Draba muralis.
Polygala oxyptera.
P. serpyllacea.
Sagina apetala.
Rubus plicatus.
R. Rogersii.
R. Lindleianus.
R. Scheutzii.
R. pulcherrimus.
R. Selmeri.
R. macrophyllus.
R. melanoxylon.
R. infestus.
R. sertiflorus.
R. dasyphyllus.
R. corylifolius, *agg.*
R. cæsius.
Rosa mollis.
R. canina, *vars.* lutetiana, dumalis, verticillacantha, urbica, and arvatica.
R. Glauca, and *var.* subcristata.
R. arvensis, perhaps introduced.
Epilobium angustifolium.
E. obscurum.
Circœa alpina.
Galium Mollugo †? (Walker).
Glyceria plicata.
Festuca arundinacea.

78. Peebles.

(All recorded by the late *Robert Smith*, B.Sc., in "Ann. S. N. H.," 1901, p. 103.)

Erica Tetralix.
Pinguicula vulgaris.
Luzula maxima.
Eriophorum vaginatum.
Carex echinata.
C. lævigata.
Molinia varia.

80. Roxburgh.

Peplis Portula, *W. Boyd, sp.*

84. Linlithgow.

Carex flava × fulva (*xanthocarpa*, Degl.), *A. Somerville, sp.*

85. Fife.

Stellaria nemorum
Doronicum Pardalianches †
Euphrasia brevipila, Burn. and Grem., *G. Nicholson* (*Trail*, in "Ann. S. N. H.," 1901, p. 179)
} *R. Smith, l.c.*

Utricularia intermedia
Goodyera repens
Epipactis latifolia
} *R. Smith* (*l.c.*).

88. Mid Perth.

Euphrasia scottica, Wettst., *Trail* ("Ann. S. N. H.," 1901, p. 180).

89. East Perth.

Geranium phæum † *R. Smith* ("Ann. S. N. H.," 1901, p. 103).

90. Forfar.

Geranium phæum †
Galium Mollugo †
Petasites fragrans †
P. albus †
Doronicum Pardalianches †
D. plantagineum †
Anchusa sempervirens †
Linaria Cymbalaria †
R. Smith ("Ann. S. N. H.," 1901, p. 103).

Carex divisa, *Menzies, sp.* (see *W. Barclay* in "Ann. S. N. H.," 1901, p. 230), confirming Don's record.

(All recorded by *G. C. Druce*, in "Ann. S. N. H.," 1901, pp. 104-107.)

Ranunculus heterophyllus.
Viola tricolor, *var.* Sagoti (Jord.)
Arenaria serpyllifolia, *var.* scabra, Fenzl.
Rubus Selmeri.
Potentilla palustris, *var.* villosa, S. F. Gray.
Alchemilla vulgaris, *var.* alpestris.
Artemisia Stelleriana †
Euphrasia brevipila, Burn. and Grem.
E. gracilis, Fr.
E. scottica, Wettst.
Chenopodium opulifolium, casual.
Atriplex laciniata, confirmed.
Salix Smithiana.
Quercus Robur, *var.* pedunculata.
Betula verrucosa.
B. pubescens.
Sparganium ramosum, *var.* microcarpum (Neum.).
Orchis incarnata, *var.* lanceata (Reishb.).
Carex squatilis, *var.* epigeios, Fr., Clova tableland.
C. flava, Œderi Retz. (= cyperoides, Marss.).
Glyceria plicata.
Festuca rubra, *sub-var.* juncea, Hack.
Phragmites communis, *var.* nigricans, Gr. and Gr.
Agropyron junceum.

91. Kincardine.

Viola tricolor, *var.* Sagoti (Jord.)
Rubus Rogersii
R. villicaulis, *var.* Selmeri
Alchemilla vulgaris, *var.* alpestris
Salix Smithiana
Near Banchory, *G. C. Druce* ("Ann. S. N. H.," 1901, p. 121).

Euphrasia borealis (Towns.), *P. H. Macgillivray* (*Trail*, in "Ann. S. N. H.," 1901, p. 179).
E. gracilis, Fr., *Trail, l.c.*

92. South Aberdeen.

Ranunculus Steveni
Caltha palustris, *var.* procumbens, Beck.
C. radicans
Viola tricolor, *var.* Sagoti (Jord.)
Habenaria viridia, *var.* bracteata, A. Gray
Carex canescens, *var.* dubia, Bailey
Festuca rubra, *subvar.* barbata, Hackel

G. C. Druce ("Ann. S. N. H.," 1901, pp. 35-37.)

Rubus radula, *var.* echinatoides, Rogers
Euphrasia brevipila, *var.* subeglandulosa, Towns.
E. Rostkoviana, Hayne
E. brevipila × curta
E. brevipila × Rostkoviana
E. brevipila × scottica

Trail ("Ann. S. N. H.," 1901). *det.* Rev. W. M. Rogers.

93. North Aberdeen.

(All recorded by *Prof. Trail*, in "Ann. S. N. H.," July 1901 to January 1902, from district north of River Ythan.)

Ranunculus Bandotii.
R. Flammula, *f.* radicans, Nolte.
R. reptans, L., confirmed.
R. acris, L., *forma* tomophyllus, Jord.
rectus, Bor.
Steveni, Andrz.
vulgatus (Jord.).
Castalia speciosa? †
Fumaria pallidiflora.
F. confusa.
Cardamine flexuosa.
Cochlearia grœnlandica.
Reseda Luteola.
Viola ericetorum.
V. Curtisii (confirmed).
V. cornuta, L. †
Polygala vulgaris, *seg.*
Cerastium tetrandrum.
C. glomeratum, apetalum.
Sagina ciliata.
Spergula arvensis, *b*, vulgaris.
Spergularia neglecta.
Prunus Avium.
P. Padus.
Rubus idæus, obtusifolius.
R. villicaulis.
R. mucronatus.
R. melanoxylon.
R. radula.
R. foliosus.
R. corylifolius, and *var.* cyclophyllus.
Alchemilla vulgaris.
a, pratensis.
b, alpestris.
Rosa involuta.
R. hibernica, *var.* glabra.
R. rubiginosa.
R. canina, *var.* dumalis.
var. lutetiana.
R. glauca.
R. coriifolia.
Drosera anglica × rotundifolia.
Myriophyllum spicatum.
Callitriche hamulata.
C. autumnalis.
Lythrum Salicaria.†
Epilobium hirsutum, confirmed.
E. montanum, minus.

E. obscurum.
E. palustre, lavandulæfolium.
E. obscurum × palustre.
E. obscurum × parviflorum.
Peucedanum Ostruthium.† By roads.
Viburnum Opulus.† ?
Galium Mollugo.
G. sylvestre.
G. palustre, *b*, Witheringii.
Valeriana pyrenaica.
Matricaria discoidea.† Quite naturalised.
Petasites albus.†
Arctium minus.
A. intermedium.
Carduus crispus.
Mariana lactea.†
Taraxacum officinale, *var.* palustre.
Anagallis arvensis.† ?
A. cœrulea † ?, casual.
Vinca minor †, a denizen.
Gentiana baltica.
Symphytum peregrinum.† By roads and fields.
Anchusa sempervirens.
Omphalodes verna.†
Linaria repens.†
Euphrasia borealis, Wettst.
var. eglandulosa.
E. brevipila, B. and Grem.
E. curta, Fr.
var. glabrescens, Wettst.
E. gracilis, Fr.
E. scottica, Wettst.
E. Rostkoviana, Hayne.
E. brevipila × curta.
E. brevipila × Rostkoviana.
Rhinanthus major ?, casual.
Utricularia minor.
U. intermedia.
Mentha viridis.†
M. Piperita †, well established.
M. sativa, and *var.* paludosa.
M. rubra, rare.
Lamium hybridum.
Chenopodium album.
a, incanum.
b, viride.
Atriplex patula.
b, erecta.
c, angustifolia.
A. hastata.
A. laciniata.
Polygonum aviculare.
a, agrestinum.
b, vulgatum.
f, littorale.
P. lapathifolium.
Rumex conglomeratus, Murr., confirmed.
R. crispus × domesticus (propinquus, Aresch.).
R. crispus × obtusifolius (acutus, L.).
R. domesticus × obtusifolius (conspersus, Hartm.).
Betula verrucosa } Usually where
B. pubescens } planted.
Quercus Robur, *a*, pedunculata.
Orchis latifolia, *seg.*
Habenaria bifolia, *seg.*
Juncus supinus, *var.* comosus, Breb.
Luzula erecta.
Potamogeton natans, *var.* prolixus, Koch.
P. polygonifolius, *var.* cordifolius, Chaix.
P. alpinus, *var.* annulatus, Balbis.
P. pusillus, *var.* tenuissimus, Koch.
P. filiformis.
Scirpus pauciflorus.
Carex teretiuscula.
C. vulpina.
C. remota.
C. Goodenowii, *var.* juncella.
C. limosa.
C. pallescens.
C. sylvatica.

C. lævigata.
C. distans.
C. flava, *seg.*
var. Œderi, Ehrh.
var. cyperoides, Marss.
C. flava × fulva (Xanthocarpa).
Deschampsia discolor.
Avena strigosa.†
A. fatua.†
Glyceria aquatica.† ?
Festuca sylvatica.
F. elatior, *var.* pratensis.
Bromus secalinus ?, casual.
Agropyron repens, *var.* barbatum.
Juniperus nana.
Phegopteris polypodioides.
Equisetum palustre, *var.* polystachyon.
Chara fragilis, *seg.*
var. delicatula.
C. aspera.
C. hispida.
C. vulgaris.

94. Banff.

(All recorded by *Prof. Trail*, in "Ann. S. N. H.," July 1901, chiefly from N.E. extremity.)

Ranunculus Flammula, *f.* radicans.
Fumaria pallidiflora.
F. confusa.
Viola cornuta, L.†
C. glomeratum, apetalum.
Spergularia neglecta.
Trifolium agrarium.†
Rubus plicatus.
R. Rogersii.
R. melanoxylon.
R. radula.
R. Kochleri.
Alchemilla vulgaris.
a, pratensis.
b, alpestris.
Rosa hibernica, *var.* glabra.
R. canina, lutetiana.
R. glauca.
Rosa coriifolia.
Callitriche hamulata.
Epilobium obscurum.
Galium Mollugo.
G. sylvestre.
Valeriana pyrenaica.†
Matricaria discoidea.
Arctium minus.
Sonchus asper.
Gentiana baltica.
Euphrasia borealis, Wettst.
E. curta, Fr., *var.* glabrescens, Wettst.
E. gracilis.
E. Rostkoviana.
Mentha piperita.†
M. sativa.
Lamium intermedium.
Atriplex patula, erecta.
Polygonum lapathifolium.
Rumex conspersus (= domesticus × obtusifolius).
Betula verrucosa.
Quercus Robur, pedunculata.
Elodea canadensis.
Orchis latifolia, *seg.*
Glyceria aquatica.
Agropyron repens, barbatum.
Ophioglossum vulgatum.

95. Elgin.

Euphrasia curta, Fr., *var.* glabrescens, Wettst.
E. gracilis, Fr. } *Trail, l.c.*

98. Argyll.

Nasturtium palustre, confirmed
Rubus Rogersii
R. Lindleianus
R. pyramidalis
R. macrophylloides
R. infestus
Rosa mollis, confirmed
} All by *Rev. W. Moyle Rogers.*

Taraxacum officinale, *var.* palustre
Euphrasia foulaensis, Towns.
Mentha piperita, Huds.
Sparganium ramosum, *var.* microcarpum
} *G. C. Druce* ("Ann. S. N. H.," 1901, p. 121).

100. Bute.

All by *Rev. W. Moyle Rogers.*

Rubus rhamnifolius.
R. pyramidalis.
Rubus infestus.

101. Cantire.

Cochlearia danica
Arabis hirsuta
Symphytum officinale
Juncus alpinus
Hymenophyllum Tunbridgense
} *A. Somerville, sps.*

102. Ebudes, S.

Vaccinium Oxycoccus, *sp.*
Verbascum Thapsus, *sp.*
Arum maculatum, *sp.*
Allium vineale, *sp.*

All by *Dr. Gilmour* (*ex* A. Somerville).

105. Ross, W.

(See "Ann. S. N. H.," 1901, pp. 107-8.)

Hypericum perforatum.
Geranium lucidum.
Ligusticum scoticum.
Trientalis europæa.
Gentiana baltica.
Plantago media.

106. Ross, E.

Silene acaulis
Hieracium Backhousei
Euphrasia curta
E. foulaensis
Salix Lapponum
} All by *Rev. E. S. Marshall.*

107. Sutherland, E.

All by *Rev. E. S. Marshall.*

Thalictrum alpinum.
Dryas octopetala, *sp.*
Saxifraga oppositifolia.
Hieracium nitidum.
Arctostaphylos alpina, *sp.*
Euphrasia curta.
Salix Myrsinites, *sp.*
Orchis incarnata.

108. Sutherland, W.

All by *Rev. E. S. Marshall.*

Fumaria Borœi, *sp.*
Lychnis alba × dioica.
Spergularia marina.
Pyrola rotundifolia, *sp.*
Salsola Kali.
Juniperus intermedia.

110. Hebrides.

Euphrasia borealis (Towns.), Berneray, *Mrs. M. Macgillivray* (*Trail*, in "Ann. S. N. H.," July 1901).

111. Orkney Isles.

Fumaria pallidiflora, F. muralis, Cochleari grœnlandica, *sp.* } *Marshall.*
Euphrasia borealis (Towns.), E. curta, Fr., *var.* glabrescens, Wettst. } *Trail*, in "Ann. S. N. H.," July 1901.
E. latifolia, *Marshall.*
E. gracilis, Fr., *Trail, l.c.*
Glyceria plicata, *Marshall, sp.*, to remove doubt.

NOTES ON ABERDEENSHIRE ROSES.

By William Barclay.

In the latter part of the year 1900, Professor Trail sent me for review a parcel of roses gathered that year in the Buchan district of Aberdeenshire and Banffshire. A few weeks ago I received from the same collector another parcel, gathered this year, mostly in the same district, but in different localities. A few are from stations in other parts of the county of Aberdeenshire.

The following table gives the result of my examination of the specimens. It is drawn up on the same plan as that followed in the 'Notes on Scottish Roses,' published in this

Journal in 1896, slightly modified as regards *R. glauca* and *R. coriifolia* to correspond with M. Crépin's analysis of these, given in the 'Revision des Rosa de l'herbier Babington,' as it appeared in the *Journal of Botany* in 1896. The Nos. are those given to the specimens by the collector, those collected this year beginning with No. 50.

R. PIMPINELLIFOLIA, *Linn.*

Var. *spinosissima*, Linn.

Nos. 10, 51.

Although only two specimens have been sent, the species is not uncommon in the county, especially towards the sea-board. The variety is distinguished by its aciculate peduncles. Sometimes the acicles are very few; in other cases the peduncle and even the base of the fruit is densely acicular.

R. MOLLIS, *Sm.*

Nos. 7, 9, 13, 16, 27, 33, 34, 38, 45, 50, 56, 58, 60.

These specimens show a good deal of variation. The leaflets vary much in respect of hairiness, especially on the under side. They are sometimes almost destitute of glands on the under surface, but generally vary from being thinly to densely glandular. This is the case also with the pedicels, fruits, and backs of the sepals. The fruit, though usually globular, is sometimes broadly oblong.

R. TOMENTOSA, *Sm.*

Nos. 1, 3, 4, 14, 18, 25, 26, 28, 31, 43, 48, 61, 62, 67, 71, 74, 77, 79, 82, 85, 86, 88.

There is also much variation here. In some, as in 62 and 85, the prickles are long, stout, and decidedly curved; in others, as 74, they are slender and with scarcely perceptible curvature. The pedicels are sometimes short, as in 62 and 88, whilst in others, as in 71 and 82, they are much longer than the fruit. They are in all the specimens more or less glandular, sometimes, as in 82 and 85, densely beset, as well as the fruit, with long, spiny glands.

The leaves, as in *R. mollis*, differ much in degree of hairiness and glandulosity, whilst in shape they vary from broadly to narrowly oval or ovate, with the point obtuse or acute. The fruit may be globose, as in 67 and 85, or ovate, as in 62 and 86. No. 79 has very small, narrow fruit, seemingly not properly developed. It would serve no good purpose to attempt to classify them under any of the so-called named varieties.

R. RUBIGINOSA, *Linn.*

Nos. 17, 22, 36, 37, 44, 70.

R. CANINA, *Linn.*

Group *R. lutetiana*, Lem.

Nos. 40, 42, 81, 83.

Group *R. dumalis*, Bechst.

Nos. 46, 64.

No. 64 has on the barren stem irregular prickles, the very large, uncinate prickles of the species running down to short, slender, straight acicles. I have seen this occasionally on other forms of *R. canina*.

None of the other groups of *R. canina*, as analysed by M. Crépin, are represented in the parcels. Variations of group *R. dumetorum*, Thuill., must, I think, occur. In fact, I am almost certain that I have seen specimens of this group in N. Aberdeen, in the neighbourhood of Huntly. The other groups are not so likely to be found.

R. GLAUCA, *Vill.*

I. Teeth simple, pedicels smooth, sepals with or without glands on the back.

No. 5.

The type of Villars.

II. Teeth double or composite, pedicels smooth, sepals with or without glands on the back.

Nos. 2, 19, 20, 29, 35, 47, 49, 53, 65, 68, 72, 75, 76, 84, 24, 30, 32, 39, 41, 87.

In the last six Nos. the sepals are more or less glandular on the back.

This group, to which var. *subcristata*, Baker, belongs, is evidently abundant in Aberdeenshire, as it is in Perthshire and some other counties.

III. Teeth simple, pedicels hispid-glandular, sepals with or without glands on the back.

No specimen.

Most likely this form does occur, though perhaps rarely. I have a note of having seen it near Keith, in Banff.

IV. Teeth double or composite, pedicels hispid-glandular, sepals glandular on back.

Nos. 15, 30, 52, 54.

In No. 15 the glands extended to the fruit, which happens but rarely in Scotland, so far as I have observed. In Nos. 15 and 52 the petioles are glandular, and the glands extend to the mid-rib and even to the secondary veins on some few leaflets.

The next two of Crépin's groups comprise those forms of *R. glauca* which have the under side of the leaves more or less glandular. These appear to be exceedingly rare in Scotland, and none of the specimens can be referred to them.

R. CORIIFOLIA, *Fr.*

I. Teeth simple, pedicels smooth.

Nos. 11 and 63.

The type of Fries.

II. Teeth double or composite, pedicels smooth.

Nos. 59, 66, 73.

I have some doubt as to No. 73. It may be a *sub-collina* form.

III. Teeth simple, pedicels hispid-glandular.

Nos. 6, 8, 12, 78.

These have also the sepals glandular on the back.

IV. Teeth double or composite-glandular, pedicels hispid-glandular.

No specimen.

V. Teeth double or composite-glandular, pedicels smooth, leaflets more or less glandular below.

No specimen.

VI. Teeth double or composite-glandular, pedicels hispid-glandular, leaflets more or less glandular below.

No specimen.

It is very likely that forms belonging to these three groups occur in the Buchan district, though not represented in the gatherings. Group V. certainly occurs in N. Aberdeen, as I have a note of having seen two bushes belonging to it near Huntly.

It should be noted that the foregoing analysis of *canina*, *glauca*, and *coriifolia* forms is quite artificial. Each division represents not merely a variety, but a group of allied forms, which, however, differ in secondary respects from each other. Many, if not most, of the groups comprise forms which have been described and named as varieties, and even as distinct species.

R. INVOLUTA, *Sm.*

Nos. 21, 57, 69.

Nos. 21, from near Ellon, and 57, from Aberdour, are on the whole similar. The former has the leaflets less hairy and more glandular on the under side, and the fruit much more bristly than the latter. In both the heteracanthy is distinct on the flowering as well as the barren branches, and the sepals are almost quite simple. Probably both are hybrids between *pimpinellifolia* and *tomentosa*, but it is not safe to dogmatise on this point without studying the bushes *in situ*. It is possible enough that *mollis* might be the second parent.

No. 69, from near Turiff, appears to be very different. It puts me very much in mind of *R. pimpinellifolia* × *rubiginosa*; but the specimens are not sufficient to decide the matter, and therefore I reserve my opinion till I can see better specimens, or, if possible, the bush itself.

R. HIBERNICA, *Sm.*

Var. *glabra*, Baker.

Nos. 55, 81.

These two specimens of this rare hybrid come from widely-separated localities—the former from Gamrie, Banffshire, the latter from St. Fergus, Aberdeenshire. This forms, I think, a new record for both counties.

Both Nos. correspond closely in all essential points with specimens which I possess, some gathered by myself, and others received from correspondents. No. 55 has the prickles on the barren stem much denser, and the main ones much larger than No. 81. In both, though the prickles are somewhat deflexed, there is scarcely any perceptible curvature. There is decided heteracanthy on the flowering as well as on the barren stem. Leaves with nine leaflets occur on both, but are most numerous on the former, which seems to have been in more vigorous growth. On No. 55, which was gathered on 24th August, there is but one fruit, well developed as regards size, and with the sepals, which have one or two very slender pinnæ, closely reflexed. On number 81, which was gathered on the 26th October, there is one not well-developed fruit, still green, and also with reflexed sepals. Wrapped in paper are two fruits from the same bush, which have reddened. On these the sepals, much shrivelled, seem also to be reflexed, and to be quite persistent. On opening one of these fruits I found only one achene, apparently well formed. We may conclude, then, that these bushes, though they may flower profusely, are almost quite barren, as is usually the case also with *R. involuta*.

From the reflexed sepals one is seemingly driven to the con-

clusion that these two bushes must be hybrids of *R. pimpinellifolia* and a form of *canina*, probably of the group *lutetiana*. As *R. glauca* is much more abundant in the district than *R. canina*, one would have rather expected *R. glauca* to be the second parent.

[A brief statement of the local distribution of the Roses referred to by Mr. Barclay may be of use. They were, with few exceptions, collected in the district of Buchan as now limited, *i.e.* between the rivers Ythan and Deveron. This area lies in H. C. Watson's vice-county (93), N. Aberdeen, except that in its north-western angle the entire parish of Gamrie and two small portions of Alvah belong to Banff (94). In Aberdeenshire Buchan are eighteen entire parishes, ten along its coast, and portions of six which are intersected by the Ythan. Buchan as a whole is poor in Roses, especially in its central and north-eastern parishes. The valleys of the Deveron and Ythan, and the sea-coast parishes of Gamrie in Banff, and Aberdour in N. Aberdeen, form exceptions to this poverty. In the valley of the Ugie they are much less frequent. I am glad to have this opportunity to express my thanks to Mr. Barclay for the great trouble he has taken to determine the forms represented in the gatherings.

The distribution is indicated under vice-counties 92 (S. Aberdeen), 93 (N. Aberdeen), 94 (Banff), by parishes, under the river-basins and along the sea coast. Under each parish the species observed in it are enumerated, the numbers quoted above by Mr. Barclay being stated for each species. A few species are merely named under some parishes without numbers, having been seen but not collected there.

Vice-County 92, S. Aberdeen.

Peterculter, by Dee, near Cults.—*R. tomentosa*, Sm., 86, 88; *R. glauca*, Vill., 87.
New Machar.—*R. tomentosa*, Sm., 85.

Vice-County 93, N. Aberdeen.

Coast Parishes.—Slains, *R. mollis*, Sm., 45; *R. tomentosa*, Sm., 82; *R. canina*, L., var. *lutetiana*, Lem., 81, 83.
Cruden, *R. pimpinellifolia*, L., var. *spinosissima*, L.; *R. glauca*, Vill., 84.
St. Fergus, *R. hibernica*, Sm., var. *glabra*, Baker, 80, a large clump; *R. tomentosa*, Sm., 79; *R. rubiginosa*, L.

Crimond, *R. rubiginosa*, L.
Lonmay, *R. tomentosa*, Sm., 43.
Aberdour, *R. pimpinellifolia*, L., var. *spinosissima*, L., 51; *R. involuta*, Sm. 57; *R. mollis*, Sm., 50, 56, 58, 60; *R. tomentosa*, Sm., 61, 62; *R. rubiginosa*, L.; *R. canina*, L., var. *dumalis*, Bechst., 64; *R. glauca*, Vill., ii. 53, iv. 52, 54; *R. coriifolia*, Fr., i. 63, ii. 59.

Ythan Valley.—Logie-Buchan, *R. rubiginosa*, L., 22.
Ellon, *R. involuta*, Sm., 21; *R. tomentosa*, Sm., 18, 77; *R. rubiginosa*, L., 17; *R. glauca*, Vill., ii. 2, 19, 20, 76.
Fyvie, *R. tomentosa*, Sm., 48; *R. canina*, L., var. *dumalis*, Bechst., 46; *R. glauca*, Vill., ii. 47.

Ugie Valley.—Longside, *R. glauca*, Vill., ii. 75.
Strichen, *R. tomentosa*, Sm., 1.
Tyrie, *R. mollis*, Sm., 27; *R. tomentosa*, Sm., 25, 26; *R. glauca*, Vill., ii. 24.

Deveron Valley.—Turriff, *R. involuta*, Sm., 69; *R. mollis*, Sm., 33; *R. tomentosa*, Sm., 31, 67; *R. rubiginosa*, L.; *R. glauca*, Vill., ii. 32, 49, 65, 68; *R. coriifolia*, Fr., ii. 66.
King Edward, *R. mollis*, Sm., 16, 34, 38; *R. tomentosa*, Sm., 4, 14, 28, 71, 74; *R. rubiginosa*, L., 36, 37, 70; *R. glauca*, Vill., ii. 29, 30, 35, 39, 72, iv. 15; *R. coriifolia*, Fr., 73 (? *subcollina*).

Vice-County 94, Banff.

Alvah, *R. mollis*, Sm.; *R. tomentosa*, Sm., 3; *R. canina*, L., var. *lutetiana*, Lem., 40, 42; *R. glauca*, Vill., ii. 41.

Gamrie, *R. pimpinellifolia*, L., var. *spinosissima*, L., 10; *R. hibernica*, Sm., var. *glabra*, Baker, 55; *R. mollis*, Sm., 7, 9, 13; *R. glauca*, Vill., i. 5; *R. coriifolia*, Fr. i. 11, iii. 6, 8, 12.

James W. H. Trail.]

ADDITIONS TO THE FLORA OF BUCHAN.

By James W. H. Trail, A.M., M.D., F.R.S., F.L.S.

During the past year I have continued my investigation of the flora of Buchan, and have obtained several additions to the previous records for that district. Circumstances prevented my visiting any part of Buchan, except the parishes of Slains and Ellon, until the end of July; but August was

spent in Aberdour and the surrounding parishes. This district proved well deserving a visit, Aberdour especially being rich in species not seen, or very rarely seen, elsewhere in Buchan. Its greater richness appears chiefly due to the low sandstone hill that runs inland from Pennan Head, deeply cut by small streams into narrow sheltered valleys or dens. These dens, especially the small Den of Auchmedden, near Pennan, have long had a local reputation for their wealth in plants. The others are known as the Den of Aberdour (about three miles along the Dour burn from south to north, with seven tributary dens), the Den of Troup (also from south to north, separating Aberdour from Gamrie in Banffshire), and the Den of Glasslaw (nearly from west to east, along the Gonar burn, the chief source of the North Ugie).

During September and October, and on 2nd November, I visited as often as I could other parts of the district, including the parishes along the east coast from Slains to Lonmay, Logie-Buchan, Ellon, Longside and Old Deer, Fyvie, Auchterless, Turriff, King Edward, and Alvah.

As before, I have received valuable aid in the identification of the critical forms from Mr. Arthur Bennett, F.L.S., Mr. William Barclay (*Rosa*), Mr. James Groves, F.L.S. (*Characeæ*), and the Rev. W. Moyle Rogers (*Rubus*). The Rev. E. S. Marshall has kindly examined the examples of *Epilobium*, and Mr. F. J. Hanbury, F.L.S., of *Hieracium*. New records for the vice-counties 93 (N. Aberdeen) and 94 (Banff) are indicated by these numbers, followed by an asterisk.

Thalictrum dunense, Dum.—Not a common plant on the coast of Buchan, though scattered here and there from Slains to Gamrie. I have found it in eight of the eleven parishes along the coast, but in moderate abundance only on some of the inner sandhills at Cruden Bay, and on the links east of Rosehearty in Pitsligo.

Ranunculus fluitans, Lam.—Plentiful in the Deveron. In the Ythan above Ellon grows a plant (unfortunately not found bearing flowers or fruits) that Mr. Bennett thinks must be either *R. fluitans*, var. *Bachii*, or *R. pseudo-fluitans*, Bab.

R. Lenormandi, F. Schultz.—In an old backwater of the Deveron (now quite cut off from the river), in Alvah, near Bogbraes,

grows a form of *Batrachium* that Mr. Bennett believes is a floating form of this plant, but that he could not match with any continental form. *R. Lenormandi* has not been recorded from East or North Scotland.

R. Flammula, L.—The form *radicans*, Nolte, is frequent in Gamrie and elsewhere in 94*, in suitable habitats.

Barbarea vulgaris, L.—Though recorded from Schivas, in Tarves, by Dr. Skene, considerably over a century ago, this plant is very scarce in Buchan, chiefly occurring here and there near the Deveron.

Alyssum calycinum, L.—In a wall by a road in Auchterless; a casual.

Cochlearia danica, L.—Coast of Slains and Aberdour, but not common.

C. grœnlandica, L.—93*, among short turf on the top of cliffs near Old Castle of Slains, in May; common. An example of what appears to be this was found, in rather advanced condition, in the Den of Auchmedden in August.

Subularia aquatica, L.—This has been recorded from the lake in Pitfour Grounds, Old Deer. I have looked for it there in vain, but found one example, in fruit, in September, in the Meikle Loch of Slains, a habitat about a mile from the sea.

Lepidium hirtum, Sm. — Extremely scarce in Buchan. A few examples were found on the east bank of the Deveron, in King Edward.

Cakile maritima, L.—Sandy coast, but usually very scarce. Only in one place in St. Fergus have I seen it fairly common.

Reseda Luteola, L.—Several plants in the Den of Troup, on the Aberdour side of the burn.

Helianthemum Chamœcistus, Mill.—Now known to occur in ten of the twenty-six parishes in Buchan; abundant in places.

Viola cornuta,—L. 93*. This may claim a place among the plants of Buchan as an "alien," since it is thoroughly established in large patches for some distance along a stream and elsewhere in the parish of Cruden, and also grows in Turriff. I have found it also well established in localities in South Aberdeen, 92*, and in Banff, 94*.

Polygala vulgaris, L., *segr.*, though less frequent than *P. serpyllacea*, is met with pretty widely.

Lychnis Githago, Scop.—This seems almost confined to the patches of oats and tares grown as fodder, and gives the impression of frequent importation in the seed.

Cerastium glomeratum, Thuill. — The state *apetalum*, Dum., is common. It scarcely seems worthy of varietal rank.

C. arvense, L.—Very local; observed in one locality in each of the parishes, Slains, Old Deer, and Fraserburgh.

Radiola linoides, Roth.—Occurred plentifully in a second locality in Slains and on the coast of Aberdour near its eastern boundary.

Acer campestre, L.—93*, a bush by road in west part of Fyvie.

Trifolium medium, L.—Is not frequent, though wide-spread.

Rubus idæus, L.—*b*, *obtusifolius*, Willd.—93*. Of this curious form (recorded by me in this journal last July, from Tolquhon in Tarves) a considerable bed exists in a wood a little way to the north of the railway station in Longside. On the margin of the bed at one side it mingles with the ordinary *R. idæus*, but I could not find any intermediate forms.

R. plicatus, W. and N.—94*, in an old quarry near Bogbraes, Alvah.

R. thyrsoideus, Wimm.—Of this I gathered a specimen by the road, quite near the west gate to Pitlurg House, Slains; but it was double-flowered, and appeared to have been planted there. I may say that I have not seen any truly wild bramble in Slains.

R. mucronatus, Blox.—93*, in a plantation near Auquharney House, in Cruden.

R. melanoxylon, Müll. and Wirt.—93*, 94*, very frequent in Aberdour; also in Turriff, Alvah, and Gamrie.

R. radula, Weihe.—93*, Den of Auchmedden, Aberdour.

R. corylifolius, Sm.—Frequent in Aberdour, Tyrie, and King Edward.

var. *cyclophyllus*, Lindeb.—93*, roadside near Boyndlie, Tyrie.

R. saxatilis, L.—Locally plentiful in Aberdour; scarce on coast of Cruden.

Potentilla procumbens, Sibth.—Widely distributed on moorlands.

Alchemilla vulgaris, L.—Not a common plant in many places; *b*, *alpestris* (Schmidt), 94*, in Alvah.

Rosa.—The forms of this genus collected by me in Buchan are treated of elsewhere in this issue, so that a few words will suffice here. Roses are abundant in the dens in Aberdour.

R. involuta, Sm.—One large clump grows in each of the parishes, Ellon, Aberdour, and Turriff.

R. hibernica, Sm., var. *glabra*, Baker.—93*, by side of a field in St. Fergus, a large clump, almost forming a hedge, 94*. Near Tor of Troup Cottage, in Den of Troup, a spreading bush. For the parentage of both *R. involuta* and *R. hibernica* consult Mr. Barclay's paper.

R. canina, L., var. *lutetiana*, Lem.—93*, by roadside in Slains, near Pitlurg House.

R. coriifolia, Fr.—93*, in Aberdour, Turriff, and King Edward.

Saxifraga oppositifolia, L.—I met with this in five or six localities in Aberdour, chiefly on the rocky coast, but also extending inland along the steep banks of the ravine of the Quingan. It also occurred on a steep slope facing the sea, east of Melrose, in Gamrie.

Chrysosplenium alternifolium, L.—In Den of Troup; local.

Drosera rotundifolia, L.—Grows on most peat-mosses in Aberdour and the neighbouring parishes, sometimes in great abundance. *D. anglica*, Huds., is much less generally diffused; but it also is very plentiful in one or two peat-mosses in Aberdour and Tyrie; and in these mosses the hybrid *obovata*, Mert. and Koch, occurs with the parents.

Hippuris vulgaris, L.—Very local, its habitats being restricted by the destruction of the peat-mosses.

Myriophyllum spicatum, L.—In a pool in Cruden. It is far less common in Buchan than *M. alterniflorum*, DC.

Peplis Portula, L.—Very scarce; in a shallow pool near Towie farm, Aberdour, and in a similar pool near Mintlaw Station, Old Deer.

Lythrum Salicaria, L.—By a mill-lade in Cruden, but almost certainly a casual.

Epilobium angustifolium, L.—A good deal of this grows in rough ground by the side of a farm-road near Ardallie, Old Deer; but the carpels are short, indicating that it is an escape or introduction there.

E. parviflorum, L.—A large glabrescent broad-leaved variety grows in a ditch in Logie-Buchan.

E. montanum, L.—This is rather a scarce plant in many localities in Buchan. A dwarf form, *minus*, Hausskn., was found in a tributary valley of the Den of Troup, in Aberdour.

E. obscurum, Schreb.—A very large much-branched form (*ramosissima*, Hausskn.) grows by the waysides in Fyvie.

E. palustre, L.—93*. The variety, *lavandulæfolium*, Hausskn., was gathered on the Forvie Links in Slains, and a white-flowered variety was found on a hill in Aberdour.

Mr. Marshall recognised among the gatherings two hybrids, *obscurum* × *palustre* (*ligulatum*, Baker), from beside the lake at Pitfour in Old Deer, and *obscurum* × *parviflorum* from Aberdour, and from Balmoor, near Peterhead.

Sanicula europæa, L.—Dens of Auchmedden and Troup.

Apium inundatum, Reichb. f.—This was found in Crimond, Longside, and Aberdour; local, but not rare where it occurred.

Sium erectum, Huds., was found last year in three additional parishes—Logie-Buchan, Cruden, and Lonmay, in one locality in each.

Viburnum Opulus, L.—Grows in the parishes of Aberdour (in the Dhustrath) and Turriff; but there can be little doubt that it is not native in Buchan.

Galium Mollugo, L.—93*, Aberdour, in the inclosure round the parish church, and 94*, by the edge of a field in Gamrie, on the west side of the Den of Troup. In both localities the plant comes near var. *Bakeri*, Syme.

G. sylvestre, Poll.—93*, ravine of the Quingan, Aberdour; 94*, braes on rocky coast of Gamrie, east of Melrose; local.

G. uliginosum, L.—Scarce and local; seen only in Old Deer, Longside, and Aberdour.

Asperula odorata, L.—Dens of Auchmedden and Troup, and in Fyvie; scarce and local.

Valeriana pyrenaica, L.—93*, 94*. Well established along both banks of the burn of Troup.

Filago germanica, L.—Very scarce, in a field near Melrose, Gamrie.

Matricaria discoidea, Dc.—In the last issue of this Journal, p. 244, may be found a brief account of the rapid extension of this plant over the parishes around Rosehearty. 94.* It has spread westward to Gardenstown in Gamrie.

(*To be continued.*)

ZOOLOGICAL NOTES.

Hedgehog in Argyllshire.—In addition to Mr. Watt's record of the above in the "Annals" for October, p. 233, I have found it at Inellan, on the hills behind the town, and also on the road to Glen Massan, from the head of the Holy Loch. As this animal is kept often in dwelling-houses as a pet, might it not in these two localities be an escape which had been translated to the coast with the owners at the annual trip "doon the watter"? In both instances the animals went free, so that they *may* be the forerunner of the species in the district.—J. Macnaught Campbell, Glasgow.

Bottle-nosed Dolphins in the Moray Firth.—Four years ago I sent a note to the "Annals" about the stranding of four Bottle-nosed Dolphins (*Tursiops tursio*) near Delny in Ross-shire, in October 1897. This year again, on the 7th October, six Dolphins of the same species were stranded in Munlochy Bay, near Inverness. I, not being informed of the occurrence, did not see them till a week afterwards, when I went to Munlochy and examined some of them, and found that they belonged to *Tursiops tursio*, a species which I am now familiar with, as I saw the four at Delny, and also a few on the coast of Texas a dozen years ago. At first I thought I might get one fresh and perfect specimen, but the skin was badly cut and many teeth broken, so only secured one skull. Mr. Beddard, in his "Book of Whales," says this is a rare species on our coasts. I hardly think that is so, as one or two may often be stranded and no notice taken of them; and as this is the second lot accidentally stranded in the Moray Firth, seen by myself within four years, I think they must be common along the coasts of Scotland in the month of October, as probably one in a hundred, or fewer, have the misfortune to get ashore. Large numbers of small whales and "porpoises" are often driven ashore by fishermen, but as a rule the species is not identified. They are "just Bottlenoses." I measured two females at Munlochy, the largest of which was 9 feet 10 inches long in a straight line from tip of snout to outside of notch of tail. The notch was 2 inches deep. The dorsal fin was 12 inches high. The colour was dark lead above and along the sides, and white below—the usual colour of this species. An embryo about a foot long had been cut out of the largest female and taken away. I tried to recover it by offering a small reward for it, but it could not be found. So I did not get a chance to count the hairs on the face, if any were present at that stage. I cannot help calling attention to the accuracy of the late Sir Wm. Flower about the length of this species, and all other species of the *Delphinus* group, when he said they seldom exceed ten feet in length. The largest Munlochy ones were said to measure "about 11 feet" in length, but they must have been measured along the curves of the body to the point of one fluke of the tail. In museums, where sometimes skulls only are preserved, the length of an animal of the species *Tursiops tursio* may be roughly ascertained. If an animal 9 feet long has a skull about 20 inches long, an animal 10 feet long will have a skull about 22 inches long. In the same way, if a Balænoptera 79 feet long has the ramus of its jaw about 21 feet long, as in the famous Longniddry whale, a Balænoptera 95 feet long must have the ramus of the jaw more than 25 feet long. If there are no 25-feet jaws in existence, I hold there are no 95-feet whales. One book says they reach a length of 100 feet, another limits them to 95 feet. Let us return to Flower again. He says the largest of all whales may attain a length of "even 85

feet." A few years ago a London magazine, that claimed to publish nothing but truth, had a story about a whale 150 feet long, accompanied by a picture of a sperm whale, which grows to a length of about 58 feet! It is recorded as a fact about a whale that "it weighed 147 tons." Who weighed it?—Wm. Taylor, Lhanbryde, 1901.

Notes on Migratory Birds observed in Southern Shetland.—Migrants have been much more numerous in the Dunrossness district during the past autumn than they were last year. On 1st September I saw a good many White Wagtails (*Motacilla alba*), but have seen very few since the 4th. On the 19th a Reeve (*Machetes pugnax*) was shot in Spiggie Marsh, and on the 25th a Spotted Crake (*Porzana maruetta*) was also obtained there. On the 27th many Ringed Plover (*Ægialitis hiaticula*), Sanderling (*Calidris arenaria*), Dunlin (*Tringa alpina*), and one Grey Plover (*Squatarola helvetica*) were seen or obtained at the Pool of Virkie. A Woodcock (*Scolopax rusticula*) was seen near Scousburgh on the same day. On the 30th a Bar-tailed Godwit (*Limosa lapponica*) and a Greenshank (*Totanus canescens*) were obtained at Virkie, and a Pied Wagtail at Spiggie. A Blackcap (*Sylvia atricapilla*) was shot at Scousburgh on the 24th of October, and a Red-necked Grebe (*Podicipes griseigena*) on Spiggie Loch on 4th November.—Thomas Henderson, Junr., Dunrossness, Shetland.

Waxwing in the Outer Hebrides.—Mr. D. Mackenzie of Stornoway writes me under date of 19th November, 1901, as follows:—"I am sending you by parcel post a specimen of what I take to be the Bohemian Waxwing (*Ampelis garrulus*), which was killed in a garden in town—*i.e.* Stornoway—by a boy with a catapult." Mr. Mackenzie then goes on to say: "A specimen was killed 25 years ago or thereby, by the then gamekeeper of the Lews, at the Lews Castle. I think several others may likely come to be recorded as obtained in the country this season, 1901." I desire to take this opportunity of asking sportsmen, ornithologists, and others whose interest may be awakened by the above note, to communicate to me any occurrences of interest which have come under their personal observation in the Outer Hebrides, and which have *not* been at any previous time recorded; or any alterations in the status of species since the publication of the "Vertebrate Fauna of the Outer Hebrides" in 1888. Corrections of actual errors or mis-statements will be equally acceptable.—J. A. Harvie-Brown.

Waxwings in Scotland.—The following records of Waxwings in various parts of Scotland have appeared in the public press. There has been a decided immigration of these birds, but though they are widely scattered over the country their numbers are not considerable.

Banffshire.—A male and female were observed in the policies of Duff House on the 16th of November.

Perthshire.—One was obtained in a garden at Pitlochry on the 27th of November.

East Lothian.—One shot at Ballencrieff on the 23rd of November, and sent to Dr. Crombie of North Berwick.

The Siskin in Perthshire.—A few Siskins (*Chrysomitris spinus*) are to be found in the fir-woods of Perthshire at all seasons of the year, but I believe that the number of resident individuals is largely augmented by winter visitants. On the 27th of February in the present year, 1901, we met with a flock of about a hundred Siskins, which we thought had gathered together prior to leaving the country. They were very tame, and several of them alighted on the road beside us. On the following day they had entirely disappeared. On the 15th of the following October I met with an immense flock of Siskins in the Tay valley between Birnam and Ballinluig. They presented the appearance of a cloud of birds, and flew round and round as if uncertain in what direction to proceed. They must have covered a considerable area, and reminded me of a swarm of bees, or a huge flock of Peewits. I had never previously met with a larger number than a hundred birds, and could not resist the conclusion that we had here a mass of birds newly arrived from the continent.—H. A. Macpherson, Pitlochry.

Siskins in the Edinburgh District.—Siskins (*Chrysomitris spinus*) have been unusually abundant here this autumn. As early as the second half of September a few were observed about Longniddry, Portobello, and Duddingston; and during October many flocks, some of them composed of scores of birds, passed over these and other localities. Large flocks, as I was told, were also seen in the Arbroath, Kirkcaldy, and North Queensferry neighbourhoods. The immigration seems to have been at its height about the second week of October; but as late as 16th November I saw three or four birds on the coast at Longniddry, and on the 23rd I met with a small flock on some alders near Ormiston. Redpolls have also been very plentiful, and a few Goldfinches were taken by the bird-catchers in East Lothian.—William Evans, Edinburgh.

Stock Dove in Caithness.—On the 4th of December I shot a Stock Dove (*Columba œnas*) near Castletown, Thurso. It was a bird of the year, and quite alone. I believe this is the first record of this species in the county.—T. E. Buckley, Castletown.

Grouse in Shetland.—By the advice and approval, after inspection of the grounds upon the Lunna estates of Shetland by "an expert," the proprietor turned down no fewer than 300 brace of Grouse. This is an experiment on a large scale, and it may prove

interesting to learn of its ultimate success. Meanwhile no birds have been shot on the property during 1901.

We do not know what advice was given with regard to what may appear to some to be trivial or of minor importance, such as preparation of the ground, and the sources of supply of such a large number of birds; nor are we fully informed as to whether all of the birds were supplied at one time, from one source, or from many. We believe the proportions of males were about one to five females. No doubt, however, we shall hear more later on. I am obliged to Mr. J. Grierson for the above items of information.—J. A. Harvie-Brown.

Grey Phalarope at Montrose.—A Grey Phalarope (*Phalaropus fulicarius*) was received by Mr. Towns to be mounted, from Mr. Collie, Montrose, which had been shot on the mud-flats of the tidal basin. Mr. Milne of Auchenblae, to whom I am indebted for the information, was told of the occurrence on the 9th of September.—J. A. Harvie-Brown.

Great Snipe in Shetland.—At last I am able to record the actual occurrence of the Great Snipe (*G. major*) in Shetland. Mr. J. Grierson sent one to me in the flesh, which was shot by him upon the 26th September, 1901, and it weighed $8\frac{1}{4}$ ozs. Now that attention is called to the occurrence of this species during the early autumn as a migrant in Shetland, it will be interesting to learn more about its visits. I believe Dunrossness and the marshes of Spiggie and Brou will be found to hold some birds almost every year, say, during the last ten days of September. Their habit may be, however, only to rest there for a day, or even less time, before resuming their migratory flight southwards.—J. A. Harvie-Brown.

Occurrence of the Great Snipe in Orkney.—While shooting with two friends, during the month of September, in the Island of Stronsay, Orkney, we flushed from a small patch of clover grass a Great Snipe (*Gallinago major*), which we were fortunate enough to secure. The bird rose within five yards of us and flew slowly, thus presenting an easy shot. The weight of this specimen was a fraction over seven ounces. About an hour later on the same day another Great Snipe rose to us from a clump of reeds, and, although shot, fell in a fresh-water loch about sixty yards from the shore, and was irrecoverable, there being no boat on the loch, and the bottom of the most treacherous description possible. The date on which these birds were shot was 25th September. A considerable number of Jack Snipe appeared just at this time.—Robert B. Bell, Edinburgh.

[A Great Snipe was shot near Castle Douglas during the past autumn; a Common Snipe and a Jack Snipe being also shot by the same gun on the same day, but the date is not mentioned.—Eds.]

Ruff (*Machetes pugnax*) **in East Renfrewshire.**—We have had something of the nature of an invasion of this species this autumn. First seen 31st August; as many as eight were seen on 29th September (seven at Lyoncross Dam and one at Balgray), the last being observed on October 5th. In the list of Birds of the Clyde area, in the recently published "British Association Handbook," this species is described as rather rare, "only about ten occurrences known to the writer."—JOHN PATERSON and JOHN ROBINSON, Glasgow.

Green Sandpiper in the Outer Hebrides.—Mr. Macculloch, taxidermist, Glasgow, received a Green Sandpiper during the past autumn from South Uist for preservation. The specimen was exhibited at a meeting of the Glasgow Natural History Society.—J. MACRURY. [This species is an addition to the fauna of the Outer Hebrides.—EDS.]

Striped Wrasse off Caithness Coast.—A specimen of this somewhat uncommon species in Scottish seas was taken on a long line, in twenty fathoms of water, and on rocky ground, a mile and a-half off Lybster harbour, in November last. This example of *Labrus mixtus* was twelve inches in length, and weighed fifteen ounces. It was very brilliant in its coloration, the upper parts being reddish-brown washed with olive, and striped and mottled with bright ultramarine; the under surface carmine. The specimen is now in the collections in the Museum of Science and Art, Edinburgh.—RICHARD LILLIE, Edinburgh.

Yarrell's Blenny on the Beach at Portobello.—On 14th November last I found a Yarrell's Blenny (*Carelophus ascanii*), 4.5 inches long, among rejectamenta at the west end of Portobello beach. A fierce gale, it will be remembered, blew from north-east on 12th and 13th. I am not aware of any previous record of the occurrence of this fish so far up the Firth of Forth.—WILLIAM EVANS, Edinburgh.

Porbeagle Shark in Clyde Waters.—It is quite a mistake to say ("Annals of Scottish Natural History," 1901, p. 237) that the Porbeagle is "extremely rare in Clyde waters." I have found it to be not infrequent in the Firth and surrounding lochs; indeed, there is scarcely a season but one is reported from some part of the district. There are two in the Kelvingrove Museum, Glasgow—one from Blairmore, caught in a net on the 8th October 1880, and another from the Firth, the exact locality not being given, but as it came with fish from the same locality, no doubt it was taken in the neighbourhood. This last individual was caught in June 1882. Several others have been from time to time offered to the Museum from various parts on the coast.—J. MACNAUGHT CAMPBELL, Glasgow.

Addition to the List of Scottish Coleoptera.—A specimen of *Heptaulacus villosus*, Gyll., verified by Mr. G. C. Champion, was taken by me at North Berwick on 15th July 1899. This insect has not so far been recorded from Scotland. In Fowler's "British Coleoptera" it is stated that it is found in "sandy and chalky places; very rare: Mickleham, Freshwater, Isle of Wight (Waterhouse), Newmarket Heath, Llandudno, Southport." It may also be of interest to mention that I have this year taken *Adimonia tanaceti*, L., on the Pentlands above Balerno. It has previously been recorded from the district. I am much indebted to Mr. Evans for assistance in identification.—W. A. Jolly, Edinburgh.

Sphinx convolvuli, *L.*, in Scotland.—Since writing the note on this moth, printed in the October "Annals" (1901, p. 239), I have seen the following further specimens:—

♀, caught at a street lamp, Leith, beginning of September. This specimen was recorded in the local newspapers as a Privet Hawk-moth (*Sphinx ligustri*).

♀, Newhaven, September.

♂, Dunbar, 30th September, sent to me by Mr. D. Bruce.

Mr. H. W. Marsden, Bristol, writes me that he got a ♀ at Inverness on 12th September.

I may mention that Mr. Harold Raeburn has kindly given me two specimens (♀'s) which he got on the Continent in August (one knocked down in the Gare de Lyon, Paris, on the 18th, the other picked up dead at about 8800 feet on the Görner Glacier, Switzerland, on the 22rd), and that I have heard of one being caught on a Leith vessel a few miles off the continental coast. It is perhaps worthy of remark that, of the nine instances in which the sex has been noted, all except one—the latest—have been females. I imagine that the caterpillars recorded were from eggs laid by immigrant females which arrived in June or July.—William Evans, Edinburgh.

Notozus panzeri, *F.*, in Scotland.—Among some Aculeate Hymenoptera which Mr. B. McGowan, Dumfries, recently sent me to name, I was pleased to find an example of this pretty little Chrysid. Mr. McGowan tells me it and another were taken by himself on Lochar Moss, Dumfriesshire, in July 1900. I have shown the specimen to the Rev. F. D. Morice, who confirms my identification. This is a most interesting addition to my short list of Scottish Chrysids, printed in this Magazine for April last (1901, p. 118).—William Evans, Edinburgh.

Rhyssa persuasoria, *L.*, in Moray.—I am indebted to my friend Mr. G. Muirhead, Speybank, Fochabers, for a specimen (♀) of this remarkable Ichneumon-fly—a parasite of *Sirex gigas*—which

was captured in a wood-shed at Speybank on 30th June last. Mr. Claude Morley, Ipswich, has kindly identified it for me.—William Evans, Edinburgh.

Amblyteles indocilis, *Wesm.*, Ichneumon liostylus, *Thoms.*, and other Ichneumonidæ in Forth.—Mr. Claude Morley has recently been good enough to examine some of my Ichneumon-flies collected in the Forth district, and has identified among them the following noteworthy species, namely:—

Amblyteles indocilis, Wesm.—3 ♀'s; from Pentlands, above Balerno, 4th October 1897; Comiston, July 1899; and Macbiehill, 1872, respectively.

Barichneumon eupitheciæ, Brisch.—♂, from larva of *Eupithecia helveticata*, Pentland Hills, 1897.

Ichneumon liostylus, Thoms.—2 ♂'s, Forest Mill, Clackmannanshire, 21st May 1901.

Ichneumon monostagon, Grav.—♂, Longniddry, 16th May 1901.

Ichneumon vulneratorius, Zett.—♀, Carnethy Hill, Pentlands, March 1894.

Ichneumon sarcitorius, L.—♀, entering burrow of *Andrena trimmerana*, Swanston, 12th June 1900; Aberdour, St. David's, etc., both sexes.

Colpotrochia elegantula, Schr.—3 ♀'s; Aberfoyle, two, 27th July 1900; Forest Mill, one, 13th July 1901.

The three first-named are, Mr. Morley tells me, new to Britain.—William Evans, Edinburgh.

Podon leuckartii, *G. O. Sars*, in the Firth of Forth and the Moray Firth.—When recently overhauling some gatherings of Entomostraca collected a good while ago in the Firth of Forth, I found, on re-examining the specimens of *Podon*, that they all belonged to the species known as *Podon leuckartii*, G. O. Sars. Having satisfied myself about these, I proceeded to re-examine a number of specimens from the Moray Firth, and found that they also belonged to the same species. So far as I know *Podon leuckartii* has not been recorded from either Firth. *Podon polyphemoides* (Leuckart) has been recorded from both places, and it is just possible that the one has been mistaken for the other. It appears that P. E. Müller, in 1867, made a similar mistake regarding these two forms (see "Danmarks Cladocera," p. 220, pl. vi., figs. 5 and 6), and De Guerne, in his paper on *Ectinosoma*, Boeck, and *Podon*, Lilljeborg, also mistook the one for the other ("Bull. Soc. Zool. de France," t. xii. p. 10). Moreover, in a paper published in the "Journal of the Birmingham Natural History and Philosophical Society," entitled 'Synopsis of the British Cladocera,' by T. V. Hodgson (published February 1895), *Podon* is represented in the British fauna

by the two species, *P. intermedius*, Lilljeborg, and *P. polyphemoides* (Leuckart); but if we take as our guide the great work by Prof. Lilljeborg on the "Cladocera of Sweden," recently published, it is evident that the *Podon polyphemoides* of Hodgson is really the *P. leuckartii*, G. O. Sars. Hodgson's formula gives 6 setæ (or hairs) for both branches of the second antennæ, which agrees with Sars's *P. leuckartii* but not with Leuckart's *P. polyphemoides*, which has 7 setæ on the lower branches. On the other hand, Leuckart's species agrees with *P. intermedius*, Lilljeborg, in the number of setæ on the branches of the second antennæ; but in *P. polyphemoides* the end joints of both branches are distinctly shorter than the similar joints in *P. intermedius*. It is interesting to note, that while *Podon leuckartii* appears to have an extensive distribution on the east coast, the species most extensively distributed on the west is *Podon intermedius*.—T. Scott, Aberdeen.

BOTANICAL NOTES AND NEWS.

Vegetable Colouring-Matters used as Dyeing Materials in the Scotch Highlands.—In *The Essex Naturalist* (1901, p. 45) is a list (sent by the Duchess of Sutherland to Professor Meldola, as compiled from various local sources of information for her book on *Woman's Work: Highland Home Industries*) which we reproduce below (without alteration of scientific names) because of its local interest, and in the hope that it may elicit further information as to the use of dyes made from native plants at the present time in any part of Scotland.

Black	Bark of Alder	*Alnus glutinosa.*
	Root of Dock	*Rumex obtusifolius.*
Blue	Blaeberry (with alum)	*Vaccinium Myrtillus.*
	Elder (with alum)	*Sambucus nigra.*
Brown	Stone lichen	*Parmelia saxatilis.*
	Dulse	*Halymenia edulis.*
	Currant (with alum)	*Ribes.*
Yellowish brown	Wall lichen	*Parmelia parietina.*
Crimson (bright)	Corcar lichen	*Lecanora tartarea.*
	White lichen	*Lecanora pallescens.*
,, (dark)	Dark lichen	*Parmelia ceratophylla.*
Flesh-colour	Bark of Willow	*Salix viminalis.*
Gray	Root of Iris	*Iris Pseudacorus.*
Green	Broom	*Genista tinctoria.*
	Bark of Furze or Whin	*Ulex europæus.*
	Heather (with alum)	*Erica cinerea.*
Magenta	Dandelion	*Leontodon Taraxacum*

Dark orange	Bramble	*Rubus fruticosus.*
Purple	Sundew	*Drosera.*
Red (dark)	Rock lichen	*Ramalina scopulorum.*
„ (bright)	Root of Bedstraw	*Galium verum.*
Scarlet	Limestone lichen	*Urceolaria calcarea.*
	Tormentil	*Tormentilla officinalis.*
Violet	Water-cress	*Nasturtium officinale.*
	Bitter Vetch	*Orobus tuberosus.*
Yellow	Root of Ash tree	*Fraxinus excelsior.*
	Bracken	*Pteris aquilina.*
Yellow (bright)	St. John's Wort	*Hypericum perforatum*
	Sundew (with ammonia)	*Drosera.*
	Bog Myrtle	*Myrica Gale.*

Some of the names seem to require revision, and the list may be extended probably by the addition of species known to readers of this Journal.

Scottish Galls.—In the endeavour to work out the distribution of the galls of the Scottish flora, I desire very much to obtain or to see specimens *from all parts of the country*, either dried or in the fresh state. The names will be gladly supplied to the senders, and the galls will be returned if that is wished. The dates and localities of collection of the specimens add to their value, as do any notes as to frequency, or on points that the collector may think of interest. All help will be greatly appreciated, and will be duly acknowledged. Specimens should be addressed to my house (71 High Street, Old Aberdeen), or to Marischal College, Aberdeen.—James W. H. Trail.

Scottish Rubi.—With specimens of *Rubi* from Buchan, a few collected by me in other parts of Scotland were kindly named by the Rev. W. Moyle Rogers. Some of the forms have not been put on record from the districts from which these specimens were brought.

R. plicatus, W. and N., var. *hemistemon* (P. J. Muell).—An example from the mouth of the Fiddich, in Banffshire, 94, and another from beside the Spey at Elchies, in Elgin, 95, "probably" belong to this.

R. Rogersii, Linton.—94*, beside the Fiddich at Craigellachie.

R. latifolius, Bab.—To this Mr. Rogers is disposed to refer a bramble gathered near the Don about a quarter of a mile from the sea, in S. Aberdeen, 92.

R. radula, var. *echinatoides*, Rogers.—92*, by the Dee, near Cults.

Of forms already recorded from the vice-counties in which I found them were *R. hirtifolius*, var. *danicus*, Focke, and *R. infestus*, Weihe, from Murthly, in Mid-Perth, and *R. mucronatus*, Blox., from New Machar, in S. Aberdeen.—James W. H. Trail.

Handbook of the Natural History of Glasgow and the West of Scotland (Glasgow, Sept. 1901).—All interested in the Natural History of Scotland must feel grateful to those who, as members of the Editing Committee, or as monographers of any of the numerous sections into which the Botany, Zoology, and Geology of the West of Scotland was divided, have rendered accessible so great an addition to previous records. A comparison with the similar volume issued in connection with the meeting of the British Association in Glasgow in 1876 shows how great progress has been made in the study of many of the groups treated of. On another page (62) the names of the various botanical lists are enumerated, with the names of their writers. That much labour has been carefully and usefully expended is evident to even a passing glance, and becomes still more so when the monographs are more carefully looked into. That the quality of the work is somewhat unequal is of course inevitable where so many have shared in it, and printers' errors are also inevitable where such work must be done in a brief time; but these are but slight blemishes in a valuable contribution to the natural history of Scotland. It may be noted that botanists may find interest in some of the lists of insects, more especially of those that injure or gall plants. The *Cecidomyidæ* (gall-midges) are enumerated on pp. 258-259; but the *Cynipidæ* (gall-flies) and their allies are omitted, although Mr. Cameron's researches had made the district classic ground for their study in Scotland, and the *Eriophyidæ* (gall-mites) also have not found a place.

CURRENT LITERATURE.

The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—October-December 1901.

[The Editors desire assistance to enable them to make this Section as complete as possible. Contributions on the lines indicated will be most acceptable and will bear the initials of the Contributor. The Editors will have access to the sources of information undermentioned.]

ZOOLOGY.

Ornithological Notes from Shetland. T. Edmondston Saxby. *Zoologist* (4), vol. v. p. 391 (October 1901).—Notes on the Chaffinch, Redstart, Nightjar, Great Skua, Great Black-backed Gull, Great Spotted Woodpecker, and Spotted Crake.

Roller in Scotland. H. A. B. H. *The Field*, 12th October 1901, p. 601.—Refers to a specimen shot at Tyninghame, Prestonkirk, in September 1897.

Solitary Snipe in Renfrewshire. Walter J. Marshall. *The Field*, 28th September 1901, p. 534.—Specimen shot on 17th September on the estate of Pollok Castle.

Widgeon in the Outer Hebrides. C. V. A. Peel. *The Field*, 21st September 1901, p. 504.—One seen on a loch in Benbecula, on 7th September, and two obtained on 9th September.

A Breeding Station of the Puffin (Fratercula arctica). W. H. Workman. *Zoologist* (4), vol. v. p. 429 and fig. (November 1901).—Refers to the Shiant Islands.

Siskins in Orkney. N. F. Ticehurst. *Zoologist* (4), vol. v. p. 425 (November 1901).—Arrival of several flocks on 21st September.

Neuroptera at Stornoway. C. A. Briggs. *Ent. Mo. Mag.* (2), vol. xii. p. 302 (December 1901).—A dozen species recorded.

Coleoptera at Stornoway, Lewis. G. C. Champion. *Ent. Mo. Mag.* (2), vol. xii. p. 279 (November 1901).—Twenty species recorded.

Four Months' Collecting in the Isle of Lewis. *Entomologist*, vol. xxxiv. pp. 305-306 (November 1901).—Notes on Lepidoptera collected by Mr. M'Arthur.

Chrysophanus phlœas, var. Schmidtii, near Paisley. A. M. Steuart. *Entomologist*, vol. xxxiv. p. 352 (December 1901).—Specimen taken in September.

Acherontia atropos, L., in Dumbartonshire. J. R. Malloch. *Ent. Mo. Mag.* (2), vol. xii. p. 258 (October 1901).—Specimen obtained at Bonhill on 9th September.

Acherontia atropos in Dumbartonshire. W. Edgar Evans. *Ent. Mo. Mag.* (2), vol. xii. p. 276 (November 1901).—Specimen caught at Ardpeaton, Loch Long, on 7th September.

Larvæ of Sphinx convolvuli in Scotland. Wm. Evans. *Ent. Mo. Mag.* (2), vol. xii. p. 298 (December 1901).—Obtained at Kirklebride, Kirkcudbrightshire, and at Dunbar.

Plusia bractea in Scotland. Wm. A. Carter. *Entomologist* vol. xxxiv. p. 297 (October 1901).—Specimen captured at Conon Bridge, Dingwall, on 19th August.

Nyssia lapponaria in Perthshire. E. A. Cockayne. *Ent. Record*, vol. xiii. p. 304 (October 1901).—Larvæ obtained this year and last.

A Contribution towards a Revision of the British Torymina. By P. Cameron. *Entomologist*, vol. xxxiv. pp. 269-276 (October 1901).—Includes several Scotch records.

Mimesa Dahlbomi and other Aculeates in Scotland. Wm. Evans. *Ent. Mo. Mag.* (2), vol. xii. p. 301 (December 1901).

Salius notatulus, Saund., and Crabro aphidum, Lep., in Scotland. A. E. J. Carter. *Ent. Mo. Mag.* (2), vol. xii. p. 277

(November 1901).—The former obtained at Aberfoyle on 8th July, and the latter at Loch Ard on 30th June.

Andrena helvola, Linn., in Scotland. J. R. Malloch. *Ent. Mo. Mag.* (2), vol. xii. p. 259 (October 1901).—Seven specimens obtained at Bonhill in May last.

BOTANY.

Handbook on the Natural History of Glasgow and the West of Scotland: British Association for the Advancement of Science, Glasgow, September 1901.

Botany, by G. F. Scott Elliot (pp. 1-3), a brief physiography.
History of Botany in Glasgow, by Prof. F. O. Bower, F.R.S. (pp. 3-5).
Phytoplankton of the Clyde Sea-area, by G. Murray, F.R.S., and V. H. Blackman (pp. 6-7).
Freshwater Algæ, by G. F. Scott Elliot (pp. 8-15).
Marine Algæ, by E. A. L. Batters (pp. 16-30).
Diatoms, by T. Comber (pp. 31-48).
Characeæ, by P. Ewing (p. 49).
Lichens, by G. F. Scott Elliot (pp. 50-60).
Fungi (*microscopic*), by D. A. Boyd (pp. 61-77).
Hymenomycetes and Gastromycetes, by William Stewart (pp. 78-92).
Hepaticæ, by P. Ewing (pp. 93-95).
Mosses, by J. Murray (pp. 96-105).
Ferns and their Allies, by W. Stewart (pp. 106-109).
Phanerogams, by P. Ewing, F.L.S. (pp. 110-130).
Measurements of Notable Trees, by John Renwick and Richard M'Kay (pp. 131-147).
Carboniferous Fossil Plants of the Clyde Basin, by Robert Kidston, F.R.S.E., F.G.S. (pp. 468-476).

Some Plants of South-west Scotland. By Rev. E. S. Marshall, M.A., F.L.S. *Journ. Bot.*, 1901, pp. 389-391.—Several additions are recorded for vice-counties 98, Argyll (three); 99, Dumbarton (three forms of *Rubus*); and 100, Bute (ten).

Some Kirkcudbright Mosses. By W. P. Hamilton. *Journ. Bot.*, 1901, pp. 422-424.—An enumeration of all gathered in June 1900 around Kipford, with some from Heston Island and Screel.

Jungermannia saxicola, Schrad. By Symers M. Macvicar. *Journ. Bot.*, 1901, pp. 315-316.—Records its occurrence near Aviemore, at 1200 feet, and near Killin, at 1800 feet.

New British Fungi. By Dr. C. B. Plowright. *Journ. Bot.* 1901, p. 385.—Records *Thelephora vitellina*, n. sp., on dead fir-branch at Boat of Garten, 18th September 1900, found by Mr. Scott Elliot. Differs from *T. sowerbeii*, B. and Br., in its pileus being pale egg-yellow and its spores smaller, only $3 \times 1\frac{1}{5}\ \mu$.

BOOK NOTICES.

Essays and Photographs: Some Birds of the Canary Islands and South Africa. By Henry E. Harris. 92 illustrations. (London: R. H. Porter.) Price 21s. net.

The application of the camera to the delineation of subjects ornithological has been a marked success. Indeed, so much has been accomplished through it as regards the nests and eggs of British birds, that we confess that we turn to the handsome book under consideration with a satisfaction that carries with it a tinge of relief. Here we break new ground and are afforded peeps at nature in other lands: the intermediary being a series of extremely pretty and interesting pictures, chiefly of bird-life, depicting species and scenes with which most of us are unfamiliar. Among many others we look upon the nests and eggs of the Houbara Bustard, Cream-coloured Courser, Egyptian Vulture, Secretary-bird, Hammer Kop, Black-footed Penguin; and have portraits of the Spectacled Warbler, Cape Gannets, Pied Kingfisher, Spotted Eagle-Owls; also scenes of country-life in the Canaries and South Africa. The full-page plates are 55 in number, and are of great excellence, and the same may be said of the 206 pages of letterpress, which are, happily, just what are wanted in such a book, and will be greatly appreciated. The volume is in every way a most acceptable one.

A Manual of the Birds of Iceland. By Henry H. Slater, M.A., F.Z.S., etc. (Edinburgh: David Douglas, 1901.)

This useful little volume treats shortly on the ornithology of one of the most interesting regions of Europe. A knowledge of the avifauna of Iceland is essential to those who study British birds, because it is thence that we draw a number of the winter visitors to our islands; while not a few of those migrants of double passage which traverse our shores in spring and autumn are journeying between their summer haunts in that far-off N.W. land and winter quarters which lie to the south of Britain. Thus we are in direct touch with the ornis of that Ultima Thule of the Palæarctic Region.

The book is designed as a manual for the use of naturalists, sportsmen, and tourists who desire to know something about the birds of the country. It contains a concise account of each species as an Icelandic bird, together with some useful information on their haunts, nesting habits, eggs, and plumage. The author has visited Iceland on several occasions for the express purpose of studying its avifauna; has carried his researches far into the not inconsiderable literature of his subject; and is, in addition, a well-known and skilled ornithologist. Thus the manual is the production of one who is in every way thoroughly competent to furnish us with a complete and accurate account of the bird-life of the island.

We trust, however, that this is only a pioneer volume from Mr. Slater on this subject, and that he may be encouraged by the success this little book so well deserves, to give us 'A History of Birds of Iceland'—a work that has long been, and is still, a great and growing desideratum in European ornithology.

Life by the Seashore: an Introduction to Natural History. By Marion Newbegin, D.Sc. (Lond.). With many original illustrations by Florence Newbegin. (London: Swan, Sonnenschein, and Co., Ltd., 1901.)

A modern book on this very attractive subject has long been a distinct want. It has now been supplied in a manner that is most satisfactory by Dr. Marion Newbegin.

The volume commences with a chapter on the general characteristics of shore animals, their conditions of life, peculiarities, means of distribution, etc. etc.; and is followed by a suggestive and useful one on their study, and a sketch of their classification. Then follows what may be termed the main section of the book, consisting of a series of chapters wherein are described the structure, life-histories, haunts, etc., of the very varied animals which inhabit the littoral zone of our British seas, from sponges and zoophytes to tunicates and fishes. In these a vast amount of information of both a popular and scientific nature is afforded in a lucid and particularly pleasing style; and aided much by the excellent drawings, mostly original, by the author's sister.

The book is such a useful one that further editions will doubtless be demanded. If this should be so, we venture to suggest that a short chapter should be added on methods of collecting and preserving specimens of marine animals. Most people, especially the young, begin the study of natural history by collecting specimens, and the seashore affords a happy and prolific hunting-ground; but special methods for the preservation of the captures are necessary. Then we are in doubt as to the value of the keys for identification. They are clear and concise, it is true, but, in our opinion, are of little use to any but experienced naturalists. If, however, they were accompanied by a series of outline drawings, such as appeared in Gosse's *Marine Zoology*, a further measure of usefulness would, we believe, be added to Dr. Newbegin's most excellent little volume.

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THE LATE DR. CHARLES STUART OF CHIRNSIDE.

We much regret to record the death of Charles Stuart, M.D., of Chirnside, one of the best-known naturalists of the Eastern Borders, and one of the few remaining links with a past and famous generation of North Country naturalists. He had been in failing health for some two years, and succumbed to a more than usually serious attack of illness on the 12th February last, having attained an age of seventy-six years.

Closely connected with the noble and ancient family of Murray, Dr. Stuart was born at Woodhall, Midlothian, in 1825; he was educated at the Edinburgh Institution and subsequently at Edinburgh University, taking his degree in 1846, and entering upon a medical practice at Chirnside, in Berwickshire, some two years after his qualification.

Shortly before that time the Eastern Borders had become, under the leadership of Dr. George Johnston of Berwick and others, the scene of exceptional activity in natural history, and we need only mention to ornithologists the names of P. J. Selby of Twizell, Sir W. Jardine of Jardine Hall, W. Brodrick of Belford, and T. Jerdon of Jedburgh, to geologists those of D. Milne Hume of Milne Graden and G. Tate of Alnwick, to botanists and horticulturists those of the two Bairds, the Messrs. Boyd, Drs. P. W. Maclagan and J.

Hardy, to shew how much their successors are indebted to the labours of the early members of the Berwickshire Naturalists' Club, to which Dr. Stuart was elected in 1854.

He had already evinced that enthusiasm for kindred subjects which marked his whole subsequent life, and the company in which he now found himself proved extremely congenial to his scientific tastes. He communicated many articles on various subjects to the above-mentioned club, and also to the Botanical Society of Edinburgh, of which he was a well-known member, while he was a most constant attendant at the yearly expeditions of the Scottish Alpine Botanical Club, headed by Professor J. H. Balfour.

Latterly Dr. Stuart was renowned as the raiser of the cross between the pansy and *Viola cornuta*, which gave us our "Tufted Violas" for bedding, while he devoted much time to the crossing of *Aquilegia*, *Narcissus*, and *Trollius*. *Aquilegia stuarti* commemorates his work in this direction, as does *Erica tetralix stuarti* his discovery of a very distinct subspecies of heath in Connemara.

A most skilful physician, with ideas well ahead of most of his generation, upright in life and manly in character, he was loved and valued by all those privileged to claim his friendship, while his talents were acknowledged by many an honour bestowed upon him by more than one of the learned bodies with which he was connected. A. H. Evans.

REPORT ON THE MOVEMENTS AND OCCURRENCE OF BIRDS IN SCOTLAND DURING 1901.

By T. G. Laidlaw, M.B.O.U.

The increase in the number of schedules returned for the year 1900 has been more than maintained during the past season; and it is satisfactory to note that both the Light Stations and inland observers contribute to this result, the former returning thirty-four, and the latter thirty-three schedules, representing an increase of seven and three respectively compared with the preceding year.

Another satisfactory feature is that all the faunal areas are now represented, although further observations are still much to be desired from West Ross, Sutherland, Moray, and Dee ; and it is hoped that a larger number of schedules from these areas will be available for next year's report.

Schedules for recording observations may be obtained from Mr. Eagle Clarke, Museum of Science and Art, Edinburgh. Our thanks are accorded to all those who have so kindly assisted in these inquiries by furnishing schedules or notes.

The following list gives the names of observers from whom reports have been received. The localities are arranged under the different faunal areas, proceeding from north to south, along the East and West Coasts.

Locality.	*Name of Observer.*
Shetland.	
North Unst L.H.	Henry Jamieson, Assist. Lightkeeper.
Dunrossness	Thomas Henderson, jun.
Orkney.	
North Ronaldshay L.H.	John A. Mackay, Lightkeeper.
Noup Head L.H.	Thomas J. Wallace, Lightkeeper.
Sule Skerry L.H.	James Tomison, Lightkeeper.
Stromness	H. M. Whittell.
Sutherland and Caithness.	
Thurso	Lewis Dunbar.
Moray.	
Strathglass, etc.	Lionel W. Hinxman, B.A., H.M. Geol. Survey.
Dee.	
Peterhead	Rev. William Serle, M.A.
Aberdeen District	Lewis G. Esson.
Tay.	
Fordoun	John Milne.
Blair Atholl	Bruce Campbell.
Pitlochry	The late Rev. H. A. Macpherson.
Newport, etc.	William Berry, B.A., LL.B.
Bell Rock L.H.	Robert Clyne, Lightkeeper.

FORTH.

Locality.	*Name of Observer.*
Isle of May L.H.	T. E. Arthur, Lightkeeper.
Lothians and Fife	William Evans.
Collessie, Fife	N. B. Kinnear.
Edinburgh District	Bruce Campbell.
Do.	Rev. William Serle, M.A.
Kirkliston	Sydney E. Brock.
Bo'ness	Robert Godfrey, M.A.
Dalmeny Park	Charles Campbell.
Tranent	D. Ritchie, M.D.
Aberlady	H. M. Whittell.
North Berwick	William M. Inglis.

TWEED.

Cramilt	Alexander Sim.
Broughton	A. C. Gairns.
Halmyre	D. G. Laidlaw.
Hawick	W. Renton.

WEST ROSS.

Inverbroom, Garve	Lady Fowler.
Skye, etc.	L. W. Hinxman, B.A.

OUTER HEBRIDES.

Flannan Isles L.H.	William Begg, Lightkeeper.
Monach Isles L.H.	James Black, Lightkeeper.
Island Glass L.H.	William Ross, Lightkeeper
Barra	William L. MacGillivray.

ARGYLL AND INNER HEBRIDES.

Scarnish, Tiree	Peter Anderson.
Skerryvore L.H.	John Nicol and David L. Murray, Lightkeepers.
Dhuheartach L.H.	The Lightkeepers.
Sound of Mull L.H.	William Ross, Lightkeeper.

CLYDE.

Lamlash L.H.	James Edgar, Lightkeeper.
Carmichael	Rev. J. D. W. Gibson, B.A.
Various Localities	John Paterson, John Robertson, Hugh Boyd Watt, Robert Wilson, and correspondents.

SOLWAY.

Locality.	*Name of Observer.*
Killantringan L.H.	Gilbert M'Kinnon, Lightkeeper.
Portpatrick	James M'L. Marshall.
Dalbeattie	N. B. Kinnear.
Maxwelltown, Dumfries	Robert Service, M.B.O.U.

GENERAL REMARKS.

The weather conditions during the earlier months of 1901 were exceedingly variable, with a temperature below the normal in many districts; but with the advent of the third week in April warm and genial weather set in. This continued during the greater part of May, and was followed by a very fine and dry summer.

The favourable conditions prevailing during the time when most of our summer migrants arrive did not, as some may have been led to expect, cause an early appearance in the majority of the species; indeed, a contrary result would appear to have been produced, as the average dates, save in a few isolated cases, are somewhat later than the normal, although this seems to have varied somewhat in particular districts.

A marked feature of the autumn movements was the comparative scarcity of the smaller Passerines at most of the stations, the conditions most conducive to their observation, haze and rain, having apparently been absent when most of the emigrants were passing south; consequently they did not come to any great degree within the range of observation.

The first movement on the East Coast is reported from Noup Head, where Fieldfares, Larks, and Snow Buntings were passing in some numbers between February 20 and 25; a day or two later Thrushes and Skylarks were numerous at the Bell Rock light, and at the same station, on March 11-12, Starlings, Blackbirds, Larks, Robins, and Lapwings were flying round the light in numbers. At Isle of May on April 6 many Wagtails, Wheatears, and Goldcrests were at the lantern; and on the 22nd, Willow Wrens and Redstarts. A rush of Wheatears, Redstarts, Gold-

crests, Skylarks, and Starlings is recorded at the Bell Rock on the night of April 18; while on May 1 and 8 Pipits and Redstarts, and on the 13th Willow Wrens, were passing. At Sule Skerry migrants were very numerous between April 13 and 20, the lantern being covered with birds on the night of the latter date; Redwings, Ring Ousels, Wheatears, and Snow Buntings being the species noted. Wagtails, Whimbrels, and Grey Plovers were passing on May 2 and 3; and Wheatears, Terns, and Corn Crakes on May 11 and 13. At Halmyre (Tweed) migratory flocks of Curlews, Redshanks, and other waders were passing on the evening of March 30; and a similar but more extensive movement was noted on April 23.

On the West Coast, at the Monach Isle Light station, large numbers of Blackbirds, Thrushes, Fieldfares, Starlings, and Larks were flying round light on January 6 and 15. Extensive movements of the same species, with Linnets, Pipits, Goldcrests, etc., are reported from Dhuheartach, Skerryvore, Monach, and Flannans, between March 8 and 14; and many Wheatears, Wagtails, Stonechats, Pipits, and Larks were passing the same stations from April 18 to the 28th. In the Nith valley, Solway, large overhead migrations were noted between 9.30 and 11 P.M. on April 17, 19, and 20, the calls of Curlew, Oyster-catcher, Golden Plover, Gulls, Ducks, etc., being distinguished; and on April 21 migrating Swallows were passing, going slightly north of east.

At the East Coast stations Wagtails, Wheatears, Warblers, Flycatchers, and Pipits were passing south between August 21 and September 15. The most extensive movement of the autumn occurred on October 14-16, and is recorded from North Unst to Isle of May; Thrushes, Redwings, Fieldfares, Blackbirds, Larks, Snow Buntings, etc., being observed in great numbers at all the stations, with a few Woodcock and Lapwings, etc. Minor movements of Turdidæ, Larks, Snow Buntings, etc., are noted for Nov. 1, Nov. 9-11, and Nov. 25.

The usual passage southwards on the West Coast of Wagtails, Redstarts, Whinchats, Pipits, etc., was first noted at Skerryvore on August 10—an early record. Towards

the end of August and during September the species mentioned are recorded at all the stations, the heaviest rush occurring on September 13-14. The principal rushes of Turdidæ, Larks, etc., as on the East Coast, were between the middle of October and the second week in November, the dates recorded from the different stations being—Flannans, October 23-30, great numbers, November 3 and 6; Monach, October 13-15, large numbers; Island Glass, October 26-28, flocks; Skerryvore, October 30, November 4-7, rushes; and Dhuheartach, October 23-29, and November 2-5, great numbers.

Other points worthy of note in Scottish Ornithology are the occurrence of the Waxwing (*Ampelis garrulus*) in many districts; the nesting of the Greater Spotted Woodpecker (*Dendrocopus major*) in several localities; also the extension of the breeding range of the Pintail (*Dafila acuta*) to the Border district; the occurrence of the Black Kite (*Milvus migrans*) at Aberdeen on April 16, and the capture of the Carolina Crake (*Porzana carolina*) in Tiree on October 25—the two species last named being additions to the Scottish list.

The list of rare or casual visitants to Scotland during 1901 includes the Greenland Redpoll (*Linota rostrata*) in Barra in September; Rough-legged Buzzard (*Archibuteo lagopus*) at Landside, Caithness, on January 29; Honey Buzzard (*Pernis apivorus*), Dumfries, January 17; Greenland Falcon (*Falco candicans*), Dunbeath, Sutherland, February 26, and Kingussie, Moray, in April; Turtle Dove (*Turtur communis*), Gretna, Solway, October 12; Spotted Crake (*Porzana maruetta*), Scousburgh, Shetland, September 25, and Dunbar, Forth, August 15; Grey Phalarope (*Phalaropus fulicarius*), Montrose, Tay, September 9, and Island Glass, Outer Hebrides, November 3; Great Snipe (*Gallinago major*), Shetland, Orkney, Clyde, and Solway, in September; Green Sandpiper (*Totanus ochropus*), South Uist, Outer Hebrides, in the autumn, and Braco, Tay, August 28; Smew (*Mergus albellus*), Scousburgh, Shetland, February 14; Ivory Gull (*Pagophila eburnea*), Broadford, Skye, February 6; and Fork-tailed Petrel (*Oceanodroma leucorrhoa*), Sule Skerry, Orkney, on September 9.

TURDUS MUSICUS (Song Thrush).

Shetland—Lerwick, Helendale, May 1, one. *Orkney*—Noup Head, March 9, at lantern; Oct. 14-15, rush, all night at lantern. Sule Skerry, Sept. 25, one. *Tay*—Pitlochry, Feb. 11, one, first this year, numerous by the 19th. Auchinblae, March 3, large numbers, scarce during winter. Bell Rock, Feb. 26, at lantern, one killed; April 6, at lantern; Oct. 1, on rock. *Forth*—Isle of May, Oct. 14, a few all night; Nov. 25, midnight, at lantern with Fieldfares. *Tweed*—Halmyre, Feb. 20, have returned. *Outer Hebrides*—Flannans, Oct. 23, great numbers with Redwings, stayed for ten days; Nov. 6, rush, several killed striking; Nov. 20-23, many passing with Blackbirds, etc. Monach, Jan. 6 and 15, Thrushes, Blackbirds, Fieldfares, Starlings, and Larks, flying round light; Feb. 28, numbers at light, with Starlings, etc.; April 25, numerous; Oct. 13-15, many with Blackbirds, Starlings, etc. Island Glass, Oct. 6-8, flying round light with Fieldfares, Snow Buntings, Pipits, and Wheatears; Oct. 28, three flocks of Thrushes, Blackbirds, Starlings, and Larks passed between 10 A.M. and 2 P.M.; Nov. 2, at lantern, some striking; Nov. 9, a few with Blackbirds. *Argyll and Isles*—Tiree, March 28, left after staying all winter; Oct. 12, returned; Oct. 22, in numbers. Skerryvore, March 10, at lantern with Blackbirds; Oct. 21, all night, with Redwings, Blackbirds, and small birds; Nov. 4, at lantern, rush of Turdidæ. Dhuheartach, Feb. 25, at light; March 10, all night with Blackbirds, great numbers; March 13, with Blackbirds, Larks, etc.; Oct. 23, Thrushes, Blackbirds, Redwings, and Larks, flying round light. Sound of Mull, March 5, with Blackbirds, Larks, and Pipits. *Solway*—Maxwelltown, Oct. 1, about a score, seen singly, high up, and heading south. Many groups in the hedgerows.

Principal movements, March 8-14, Oct. 14-15, Nov. 4-6, Nov. 23-25.

TURDUS ILIACUS (Redwing).

Shetland—North Unst, Oct. 15, a flock rested on rock, went south. Dunrossness, Oct. 13, one, many afterwards. *Orkney*—Noup Head, Oct. 14-15, rush. Sule Skerry, April 16, one; April 19, in large numbers 10 P.M. to 4 A.M., thirty killed; April 20-21, about twenty at lantern; May 22, one; Oct. 8, first; Oct. 16, a great rush all night with Ring Ousels and Woodcock, thirty killed; *Tay*—Bell Rock, Oct. 15, several on lantern, one killed. *Outer Hebrides*—Flannans, April 19, numerous; 21st, four; Oct. 23, great numbers, stayed for ten days. *Argyll and Isles*—Tiree, April 15, several; Oct. 8, flock. Skerryvore, Nov. 4, rush of Turdidæ, several killed; Nov. 8, three on lantern remained till daylight. Dhuheartach, Oct. 23, rush of Thrushes, Blackbirds, Redwings, and

Larks; Oct. 31, with Fieldfares; Nov. 2 to 5, great numbers Redwings, Fieldfares, and Skylarks. *Clyde*—Queen's Park, Glasgow, March 30, twelve. Carmichael, Oct. 23, arrived. *Solway*—Portpatrick, Oct. 30, a small flock.

Principal movements, April 19-20, Oct. 14-16, Oct. 23, Nov. 4-5.

Turdus pilaris (Fieldfare).

Orkney—Noup Head, Oct 14, great rush, numbers on lantern all night; Nov. 10, one. Sule Skerry, April 30, two; May 7, five; Nov. 1, all night, with Blackbirds, etc. *Moray*—Glen Cannich, Oct. 17. *Tay*—Auchinblae, May 4, last seen. Bell Rock, Jan. 3, three at lantern; May 1, on rock; Nov. 8-9, flying round light and striking; Nov. 11, one killed. *Forth*—Isle of May, Oct. 27, a few; Nov. 25, midnight, with Thrushes at lantern. *Tweed*—Broughton, May 2, large flock. *Outer Hebrides*—Flannans, Oct. 30, great numbers; Nov. 3, numbers round light, with Blackbirds, etc.; Nov. 11, fresh rush, with Starlings and Blackbirds. Monach, Jan. 6, flying round light with Blackbirds, etc.; Jan. 15, at light with Starlings and Larks. Island Glass, Oct. 6, at light, with Thrushes. *Argyll and Isles*—Tiree, Jan. 18; Dec. 25, flock. Skerryvore, Nov. 4-5, in rush of Turdidæ, several killed. Dhuheartach, Oct. 29, numbers flying round light with other birds; Nov. 4-5, great numbers, Redwings, Skylarks, etc.; Nov. 7, ten at lantern. *Clyde*—Carmichael, April 22, large flock; Oct. 19. Carmunnock, small flock. *Solway*—Closeburn, April 28, a flock of 150, a similar lot at Black Linn went eastwards. Portpatrick, April 16, a small flock; Nov. 7, a flock.

Principal movements, Oct. 14-16, Nov. 1-8-9, Nov. 27.

Turdus merula (Blackbird).

Shetland—North Unst, Oct. 15, on rock. Lerwick, Mayfield, May 5; nested at Helendale in 1901. Scousburgh, Oct. 15, one. *Orkney*—Noup Head, Jan. 22, killed on lantern. Sule Skerry, May 13, a ♀ caught; Nov. 1, all night, with Fieldfares, etc. *Tay*—Bell Rock, March 12, flying in rays; April 6, on lantern. *Forth*—Isle of May, Nov. 9, a few all night. *Outer Hebrides*—Flannans, March 9, a ♀; March 15, numbers flying round light; Nov. 3, numbers flying round, several rested on lantern; Nov. 11, great many on Island; Nov. 20-23, many passing with Thrushes; Dec. 3, several ♂'s; Dec. 22, plentiful. Monach, Jan. 6, with Fieldfares, Thrushes, etc; Jan. 15, with small birds in large numbers flying in rays; Oct. 13-15, with Thrushes, Starlings, Larks, and small birds. Island Glass, Oct. 26, numbers all day, left about 4 P.M.; Oct. 28, three flocks between 10 A.M. and 2 P.M.; Nov. 2, at lantern, some striking; Nov. 9, a few with Thrushes. *Argyll and Isles*—Tiree,

March 28, left after wintering; Oct. 22, numbers. Skerryvore, Feb. 26, several flying round light; March 10-12, several killed; April 21, all night, with Redwings, Thrushes, Wheatears, etc.; Oct. 30, at lantern, several killed; Nov. 4-7, rushes of Redwings, Thrushes, Fieldfares, etc. Dhuheartach, March 10, great numbers all night with Thrushes; March 13-14, many, with Larks; April 8, fifteen at lantern with Starlings; Oct. 14, two; Oct. 23, rush, Thrushes, Redwings, Blackbirds, and Larks. Sound of Mull, March 5, at light with Thrushes, Larks, and Pipits. *Solway*—Maxwelltown, Oct. 1, many showing restless behaviour that precedes migration.

Principal movements, Jan. 6-15, March 10-12, April 21, Oct. 13-15, Nov. 1-3, Nov. 9, Nov. 20-23.

Turdus torquatus (Ring Ousel).

Orkney—Sule Skerry, April 13, six, left on 14th; April 21, a pair, not seen again; Oct. 16, in rush, with Redwings, etc. *Dee*—Aberdeen, Sept. 7, one. *Forth*—Torduff, Pentlands, April 12; Nov. 18, two in King's Park, near Duddingston. *Tweed*—Cramilt, April 13, a pair. *Clyde*—Kildonan, Arran, April 10, numerous. *Solway*—Dumfries, April 8, arrived; April 23, most came in to-day, odd birds seen previously. Portpatrick, Sept. 27, ♂ and ♀, scarce.

Earliest observed, Solway, April 8.

Saxicola œnanthe (Wheatear).

Shetland—North Unst, April 29, one. *Orkney*—N. Ronaldshay, April 15, good many all day. Noup Head, April 16, two, late this year. Sule Skerry, April 10, first; 19th, a few; 29th, all away; May 11, a few; Aug. 21-27, a large number on the island. *Dee*—Boddam, April 4, first. Aberdeen, Oct. 20, one. *Tay*—Pitlochry, April 24, one. Tayfield, April 11, first seen. Bell Rock, April 18, two ♂'s on lantern; Sept. 12, two at lantern; 26th, several. *Forth*—Arthur's Seat, April 5, one. North Berwick, April 6, one; 9th, many. Isle of May, April 6, four at lantern. Aberlady, Sept. 28, one. *Tweed*—Broughton, April 5, several. Kirton Moor, April 6. Cramilt, April 9, several. *Outer Hebrides*—Flannans, April 7, two; 19th-22nd, numerous; May 4, several; July 28, several; Sept. 16, a rush. Monach, April 25, numerous for a few days. Island Glass, Oct. 1, several. Barra, April, 2nd week, arrived. *Argyll and Isles*—Tiree, April 6, one; 8th, several. Inverlochy, April 7; Tiree, Oct. 3, migrating south. Skerryvore, April 21, many all night, with Pipits, Stonechats, etc.; Aug. 12, at lantern, with Whinchats and Redstarts; Aug. 21, a rush with Meadow Pipits, large numbers flying round; Sept. 29, one on rock; Oct. 12, two; Nov. 13, two

on rock, also Yellow Hammer and Snow Bunting. Dhuheartach, April 4, five; Aug. 23, eight on rock; 24th, seven at lantern, 11 P.M.; Sept. 12, great numbers, Larks, Pipits, etc.; Aug. 29, rush of birds, Larks, Pipits, Wheatears, and Wagtails. Sound of Mull, March 31, one killed (leg and wing sent). *Clyde*—Lendalfoot, March 18. Beith, April 6. Lamlash, April 7, three, first seen. Carmichael, April 9, Balgray, Oct. 13. *Solway*—Dumfries, April 8, arrived.

Earliest, Clyde, Lendalfoot, March 18.

Principal movements, April 6-15, Aug. 21-27, Sept. 12-16.

Pratincola rubetra (Whinchat).

Moray—Glen Cannich, Oct. 26. *Forth*—Culross, April 25, a ♂. Kirkliston, May 1. *Tweed*—Cramilt, April 27, a pair. *Argyll and Isles*—Skerryvore, Aug. 10, at lantern, with Redstarts, early this season; Aug. 12, with Wheatears, etc. Dhuheartach, Aug. 10, twelve at lantern. *Clyde*—Carmichael, April 25. *Solway*—Portpatrick, April 26, one.

Earliest, April 25, Culross and Carmichael.

Pratincola rubicola (Stonechat).

Tweed—Halmyre, March 25, a ♀ stayed for two days. Cramilt, April 11, pair. *Outer Hebrides*—Flannans, April 21, numbers sitting round lantern; May 12, plentiful; May 18, large numbers; Sept. 14, numbers of young birds; Sept. 23, two. Skerryvore, April 20, fifteen at light; 21st, many all night with other birds. Dhuheartach, Aug. 8, eight at lantern; Sept. 14, killed at light. *Clyde*—Dunoon, Jan. 1, two.

Ruticilla phœnicurus (Redstart).

Shetland—Scousburgh, May 10, nesting ("Annals," 1901, pp. 194-95). *Orkney*—Noup Head, May 9, a ♂ killed at lantern (bird sent). *Moray*—Achilty, April 22. *Tay*—Pitlochry, April 26, a ♂. Bell Rock, April 18, at lantern. May 8, a ♂ killed at lantern. *Forth*—Isle of May, April 22, several all night (leg and wing sent); May 9, one killed. *Tweed*—Broughton, April 20, a ♂. *West Ross*—Broadford, Skye, Aug. 16. *Argyll and Isles*—Skerryvore, Aug. 10 and 12, at lantern, with Whinchats, Wheatears, etc. Dhuheartach, Oct. 1, two; Nov. 9, two at lantern; 13th, one on rock. *Clyde*—Carmichael, April 22. *Solway*—Dumfries, April 14, an old ♂. Portpatrick, May 19, one killed at Blackhead lantern. Sept. 12, killed on lantern.

Earliest, Solway, April 14.

ERITHACUS RUBECULA (Redbreast).

Shetland—Scousburgh, Feb. 1, one. Lerwick, May 10. Dunrossness, Oct. 3, one. *Orkney*—Sule Skerry, Sept. 13, one. *Tay*—Bell Rock, March 13, at lantern. *Argyll and Isles*—Tiree, Oct. 15, have come. Dhuheartach, March 16, at lantern; April 14, one at lantern; Sept. 12, one; Oct. 26, one.

SYLVIA CINEREA (Whitethroat).

Tay—Pitlochry, April 30, one. No others seen until May 6. *Forth*—Culross, April 29. Blackford Hill, May 1, one. Isle of May, May 11 (leg and wing sent). Kirkliston, Aug. 21, one. *Tweed*—Halmyre, April 28, several. *Clyde*—Giffnock, May 2. *Solway*—Maxwelltown, April 24, seen.

Earliest, Solway, April 24.

SYLVIA ATRICAPILLA (Blackcap).

Shetland—Scousburgh, Oct. 24, one shot. *Tay*—Bell Rock, Oct. 1, a ♀. *Forth*—Dalmeny, April 28. *Argyll and Isles*—Dhuheartach, Oct. 26, a ♀ on the rock. *Solway*—Maxwelltown, April 28, one; 29th, many.

REGULUS CRISTATUS (Goldcrest).

Tay—Bell Rock, March 31, on lantern. April 18, several. *Forth*—Isle of May, April 6, at light. *Outer Hebrides*—Monach, March 1, a few at light. *Argyll and Isles*—Dhuheartach, April 20, one at light. Sept. 20, one. Sound of Mull, March 17, three resting on tower. *Clyde*—Lamlash, July 20, rested on lantern. *Solway*—Dumfries, Sept, 22, a few going south. Portpatrick, Sept. 12, one killed on lantern; Sept. 15, two; Oct. 9, one.

PHYLLOSCOPUS RUFUS (Chiffchaff).

Orkney—Sule Skerry, Nov. 3 (skin received). *Clyde*—Lendalfoot, April 7. Thornliebank and Blair, April 13. *Solway*—Maxwelltown, April 21, heard. Portpatrick, April 30, one, scarce.

PHYLLOSCOPUS TROCHILUS (Willow Wren).

Shetland—Scousburgh, May 7, four. Dunrossness, two nests in process of construction found; several pairs of birds seen ("Annals," 1901, pp. 195-96). *Orkney*—Sule Skerry, Sept. 10 (♀ ad. received in flesh). *Moray*—Achilty, April 22. *Tay*—Pitlochry, April 25, one. Auchinblae, Sept. 7, last. Bell Rock, May 13, several at light; one killed. *Forth*—Slateford and Kirkliston, April 20; April 21-22, all over "area." Isle of May, April 22, at light (leg and

wing sent); May 11, all night. *Tweed*—Halmyre, April 22, several. Broughton, April 23. *Outer Hebrides*—Barra, May 9, one in garden at Eoligary. *Argyll and Isles*—Tiree, May 24, one. Skerryvore, April 13, two at lantern. Dhuheartach, April 23, one; Aug. 24, two at light. *Clyde*—Lendalfoot, April 7. Beith, April 19. Queen's Park, Glasgow, Sept. 21, one or two. *Solway*—Portpatrick, April 16, two. Maxwelltown, April 20, several; 23rd, big accession to numbers this morning; May 1, very many in this morning.

Earliest, Clyde, April 7, Lendalfoot; latest, Sept. 21, Glasgow.

Phylloscopus sibilatrix (Wood Wren).

Moray—Achilty, April 30. *Forth*—Roslin, May 2, one. *Clyde*—Beith, May 1.

Acrocephalus phragmitis (Sedge Warbler).

Tay—Pitlochry, April 24, four. *Forth*—Isle of May, May 11 (leg and wing sent). *Tweed*—Halmyre, April 25, one. *Clyde*—Giffnock and Beith, April 28. *Solway*—Portpatrick, May 3, one; Sept. 12, killed on lantern; Sept. 20, one seen on moor at Wigtown.

Earliest, April 24, Pitlochry.

Locustella nævia (Grasshopper Warbler).

Tay—Pitlochry, April 22, one singing.

Troglodytes parvulus (Wren).

Outer Hebrides—Island Glass, Oct. 21, two at lantern.

Motacilla alba (White Wagtail).

Shetland—North Unst, May 19, one; Aug. 28, one. Lerwick, May 12. Leog, Aug. 23-30. Scousburgh, Aug. 29, one; Sept. 1, a good many. *Orkney*—Noup Head, April 19, one, seldom seen here; May 19, on lantern. Sule Skerry, Aug. 31, two. *Outer Hebrides*—Barra, April 22. Flannans, Sept. 25, numerous. *Argyll and Isles*—Tiree, April 29, several; May 3, small parties every day at present; Aug. 29, passing S. Dhuheartach, Aug. 22, three; 24th, two. *Clyde*—Carmichael, March 29, single bird. Dalbeth, April 14, two ♂'s. Kilbirnie and Lendalfoot, April 20. *Solway*—April 14, on Nith at Mavisgrove.

Motacilla lugubris (Pied Wagtail).

Orkney—Sule Skerry, April 22, one; May 2, one; Sept. 5, very numerous, by the evening they had all gone. *Forth*—Isle of

May, April 6, two. *Tweed*—Cramilt, April 9, several. Halmyre, April 10, several. *West Ross*—Inverbroom, Sept. 26, preparing for flight. *Outer Hebrides*—Flannans, April 20, one; Sept. 22, numerous. *Argyll and Isles*—Tiree, March 19. Dhuheartach, May 4, four; Aug. 3 and 4, five on rock; Aug, 29, great numbers, Larks, Pipits, Wheatears, etc. *Clyde*—Carmichael, Feb. 20, returned. Lamlash, March 9, one first; 13th, numerous. *Solway*—Portpatrick, Sept. 9, large numbers. Dumfries, Sept. 26, 10.30 A.M., flying S. with many other small birds.

MOTACILLA MELANOPE (Grey Wagtail).

Outer Hebrides, Barra, April 22.

MOTACILLA RAII (Yellow Wagtail).

Clyde—Kilbirnie, April 15. Cambuslang, April 20.

ANTHUS PRATENSIS (Meadow Pipit).

Orkney—Sule Skerry, Sept. 14, flock at lantern (one in flesh received). *Tay*—Bell Rock, May 1, at lantern; Sept. 30, a flock on rock at low water; Oct. 1, at lantern. *Outer Hebrides*—Monach, April 25, numbers. Flannans, Sept. 16, numerous. Island Glass, Oct. 8, flying round but not striking, left on 9th; Oct. 21, four at light. *Argyll and Isles*—Skerryvore, April 21, many at lantern, with Wheatears, Stonechats, etc.; Aug. 21, large numbers, with Wheatears, etc.; Sept. 13-14, flying round light, Warblers, etc.; Sept. 23, six at lantern, also four larks. Dhuheartach, April 24, seven at lantern; Aug. 24, nine at light; Sept. 12, all night great numbers, Larks, Wheatears, etc. Sound of Mull, March 5, at light, with Larks, Thrushes, and Blackbirds. *Clyde*—Carmichael, April 3, return. *Solway*—Black Linn, April 28, a small flock of thirty-one resting on migration.

Principal movements, April 21-25, Sept. 12-14.

ANTHUS TRIVIALIS (Tree Pipit).

Moray—Contin, E. Ross, April 20. *Forth*—Tranent, April 21. Culross, April 9, one. *Tweed*—Halmyre, April 28, several. *Clyde*—Giffnock and Cadder, April 21, numbers.

Earliest, Contin, April 20.

ANTHUS OBSCURUS (Rock Pipit).

Outer Hebrides—Island Glass, Oct. 1, one killed at light (leg and wing sent).

Ampelis garrulus (Waxwing).

Sutherland — Helmsdale, Jan. 16, a ♀ obtained. *Moray*— Inverness, Feb. 1 ("Annals," 1900, p. 116); Nov. 16, a ♂ and ♀, Duff House, Banffshire (*op. cit.*, 1902, p. 53). *Tay*—Nov. 27, one at Pitlochry (*op. cit.*, 1902, p. 53). *Forth*—Nov. 23, one shot at Ballincrieff, E. Lothian (*op. cit.*, 1902, p. 53); Nov. 26, one found dead in garden at Abbotsford Crescent, Edinburgh; Nov. 27, a young bird shot at North Berwick. *Outer Hebrides*—Nov. 19, one killed in a garden in Stornoway (*op. cit.*, 1902, p. 52). *Clyde* —Caldercruix, Dec. 25, one shot.

Muscicapa grisola (Spotted Flycatcher).

Dee—Aberdeen, May 18, four. *Tay*—Auchinblae, May 20; Sept. 9, last seen. *Forth*—North Berwick, May 18, two. Dalmeny, Aug. 31. *Tweed*—Cramilt, May 4, a pair. Halmyre, May 4, two. *Clyde*—Lochwinnoch, May 4. Queen's Park, Glasgow, Sept. 21, several. *Solway*—Portpatrick, Sept. 11, two at lantern.

Earliest, May 4, Tweed and Clyde.

Muscicapa atricapilla (Pied Flycatcher).

Shetland—Scousburgh, May 13, one. *Orkney*—Sule Skerry, Sept. 13, a ♀ (received in flesh). *Dee*—Aberdeen, May 18, one. *Forth*—Isle of May, April 27, one. *Tweed*—May 18, nest with eggs near Hawick.

Hirundo rustica (Swallow).

Shetland—North Unst, June 22, one. Lerwick, June 19, two. Scousburgh, June 22, a good many. *Orkney*—Noup Head, June 4, two seen. North Ronaldshay, May 13, three. Sule Skerry, April 22, two; April 26, one; May 26, one. Stromness, Aug. 12, one flying W. *Tay*—Auchinblae, Sept. 21, last. Tayfield, April 19, first. Pitlochry, April 20, one flying N.; others on 21st, 22nd, and 23rd; April 25, about a hundred flying E. Bell Rock, Sept. 26, two. *Forth*—Kirkliston, April 11, one, no others until the 21st. Dalmeny, April 12, one. North Berwick, April 20. Isle of May, April 20, one; May 28, a dozen. Kirkliston, Oct. 7, one. Cramond, Nov. 11, five. *Tweed*—Cramilt and Broughton, April 20. Halmyre, April 21, several. *Outer Hebrides* — Flannans, May 13, several; May 21, one; Sept. 10 and 13, one each day. Monach, April 20, three; 29th, six. Barra, May 14. *Argyll and Isles*—Tiree, Sept. 9, four travelling S.; Sept. 21, several. Skerryvore, June 18, one, first this year; 27th, one; Sept. 7, one, two days in window, a gale. Dhuheartach, May 8, one; Sept. 8, four all day. Sound of Mull, April 16, three flying past. *Clyde*—

Lendalfoot, April 7. Lamlash, Sept. 15, in flocks, about to leave. Giffnock, Oct. 26, two flying south; Nov. 15, two. *Solway*—Dalbeattie, April 19; also Lochrutton, Caerlaverock, and Kirkcudbright; April 20, all round district. Portpatrick, April 27, one, very scarce this season; Oct. 29, one. Dumfries, Sept. 22, many going south.

Earliest, Lendalfoot, April 7; latest, Giffnock, Nov. 15.

Chelidon urbica (House Martin).

Orkney—Sule Skerry, May 16, one. *Dee*—Aberdeen, May 11, four; Sept. 11, eight. *Tay*—Tayfield, April 20, first. Pitlochry, April 24, one. Auchinblae, Sept. 21, last. *Forth*—Kinghorn, May 4, several. Kirkliston, Oct. 1, many. Davidson's Mains, Oct. 21, last seen. *Tweed*—Halmyre, April 22, several. *Argyll and Isles*—Sound of Mull, May 1, two. *Clyde*—Lendalfoot, April 21.

Earliest, Tayfield, April 20; latest, Davidson's Mains, Oct. 21.

Note.—In last year's report, Clyde, Langside, should be May 4, and not April 4 as quoted.

Cotile riparia (Sand Martin).

Orkney—Noup Head, April 27, one. *Moray*—Achilty, April 26. *Dee*—Aberdeen, Sept. 11, twenty-four, last seen. *Tay*—Auchinblae, April 28, arrived; Sept. 21, last. *Forth*—Musselburgh, April 5, one. Duddingston, April 20, two. *Tweed*—Selkirk, April 18, on Yarrow. Hawick, 18th, on Teviot. *Argyll and Isles*—Skerryvore, Sept. 29, one. Dhuheartach, Sept. 7, two. *Clyde*—Mauldslie, April 13, many. *Solway*—Maxwelltown, April 20; 24th, plentiful. Portpatrick, April 23, two; Oct. 1, last.

Earliest, Musselburgh, April 5; latest, Portpatrick, Oct. 1.

Carduelis elegans (Goldfinch).

Forth—Longniddry, Oct. 21, two. *Clyde*—Carmichael, July 15, frequented garden for some time, in song.

Chrysomitris spinus (Siskin).

Orkney—Sept. 21, arrival of several flocks ("Zoologist," 1901, p. 425). *Tay*—Feb. 27, a flock of about a hundred; Oct. 15, an immense flock between Birnam and Ballinluig ("Annals," 1902, p. 53). Bell Rock, Sept. 13, a ♀ on lantern. *Forth*—Unusually abundant in the Edinburgh district this autumn ("Annals," 1902, p. 53).

Ligurinus chloris (Greenfinch).

Shetland—Scousburgh, Dec. 18, numerous. *Tay*—Bell Rock, Nov. 28, two on rock. *Outer Hebrides*—Barra, Eoligary, April,

2nd week, left, very numerous during October. South Uist and Benbecula, very numerous in December. Flannans, Oct. 30, large flock; Dec. 17, a flock. Island Glass, Oct. 26, numbers all day, left about 4 P.M. *Argyll and Isles*—Tiree, Oct. 21, several.

FRINGILLA CŒLEBS (Chaffinch).

Shetland—Scousburgh, Jan. 31; Oct. 5. *Orkney*—Sule Skerry, Nov. 1, in rush with Fieldfares, Blackbirds, etc.; Nov. 30, one. *Outer Hebrides*—Barra, Eoligary, April, 2nd week, left, returned in October. Flannans, Oct. 30, great numbers; Nov. 13, a flock; Nov. 20, large flock; 23rd, several; Dec. 3, flock; 23rd, a flock. Island Glass, Oct. 7, flying round and striking (leg and wing sent); Oct. 26, numbers with Greenfinches, Blackbirds, and Starlings all day, left about 4 P.M. *Argyll and Isles*—Dhuheartach, Nov. 2, killed at light; Oct. 8, five at lantern; 21st, three; Nov. 10, great numbers all day. Tiree, Dec. 24, small flock at Heanish.

FRINGILLA MONTIFRINGILLA (Brambling).

Tay—Strathallan, Oct. 2, one. *Forth*—North Berwick, Nov. 17, flock; Nov. 23, about a dozen near Ormiston, E. Lothian. *Tweed*—Halmyre, March 20, several. *Outer Hebrides*—Flannans, Nov. 15, nine or ten. *Clyde*—Carmichael, Feb. 24, small flock; Nov. 13.

LOXIA CURVIROSTRA (Crossbill).

Orkney—Gramesay, Aug. 13, a ♂ in orange-red plumage, killed by Hawk (bird received). *Forth*—Aug. 13, one near Linlithgow. *West Ross*—Sept. 20, flock in Inverbroom garden.

PLECTROPHANES NIVALIS (Snow Bunting).

Shetland—North Unst, March 14, a flock; Sept. 14, on rock. Scousburgh, Oct. 29, first flock. *Orkney*—Noup Head, Sept. 24, a few; Oct. 16, all night at lantern; Nov. 10, at lantern; Sule Skerry, March 4, a large flock; April 15, a flock in summer plumage; April 20, a flock; May 3, several; June 16, three; Sept. 18, first; Nov. 1, a large flock; Nov. 6, a rush all night. *Moray*—May 21, summit of Caln-na-Gobhn, Broulin Forest, Oct. 30, three. *Forth*—North Berwick, Oct. 10, single bird. Isle of May, Nov. 28, small flock. *Tweed*—Cramilt, Nov. 11, several. *Outer Hebrides*—Flannans, March 3, flock; 6th, several flocks; 12th, numerous; 15th, in great numbers, with Larks, Blackbirds, etc.; April 20, flock, very fine plumage, nearly pure white; Sept. 25, nine; Oct. 2, in thousands; Nov. 6, great rushes, several killed; Dec. 3, a large flock. Monach, Dec. 11, a flock. Island Glass, Oct. 6-7, at light, with Thrushes, etc. Barra, April, 3rd week, left. *Argyll and Isles*—Tiree, April 16,

several; Dec. 26, very large flock. Skerryvore, Sept. 18, one; Sept. 30, one, chased by Falcon. Dhuheartach, May 1, several; Oct. 5, two; 7th, four on rock. Ben Cruachan (on top), July 1, two, ♂ and ♀.

STURNUS VULGARIS (Starling).

Orkney—Sule Skerry, Oct. 24, twelve; Nov. 11, eight. *Tay*—Pitlochry, Feb 9, a few arrived, by the 19th they had become more numerous than previously known to be. Bell Rock, March 1, one, remained all night; 11th, several at lantern; April 18, on lantern; Oct. 14, several; 23rd, two. *Outer Hebrides*—Flannans, Feb. 28, a flock; March 8, flocks; Oct. 30, seven or eight; Nov. 11, a flock. Monach, Jan. 15, flying round light with other birds; Feb. 28, numbers at light with Thrushes, etc.; Oct. 13-15, at light, with Thrushes, Blackbirds, etc. *Argyll and Isles*—Skerryvore, Jan. 22, at lantern; March 12, with Blackbirds; April 18, numbers at the lantern with Redwings; 21st, numerous all night, with Thrushes, Blackbirds, and small birds. Dhuheartach March 14, at lantern, 12 to 4 A.M., with Blackbirds, Thrushes, and Larks; April 8, fifteen at light; Oct. 11, four; Oct. 23-24, at light, with Thrushes, Blackbirds, and Larks; Nov. 1, five; 8th, eight.

CORVUS MONEDULA (Jackdaw).

Shetland—Scousburgh, Oct. 24, one shot; 25th, one. *Outer Hebrides*—Flannans, Feb. 22, one. Barra, Eoligary, May 3, one. *Argyll and Isles*—Skerryvore, Oct. 29, one, midnight.

CORVUS CORNIX (Hooded Crow).

Tay—Bell Rock, Oct. 14, one arrived from east, nearly exhausted; Nov. 3, one on lantern, fatigued.

CORVUS FRUGILEGUS (Rook).

Shetland—North Unst, March 31, a large flock; April 6, a flock going W. Scousburgh, May 16, a few. *Orkney*—North Ronaldshay, March 3, about a hundred, all day. Sule Skerry, March 3, a large flock, about a hundred, with a few Hooded Crows and one Jackdaw, arrived during the night, and stayed two days; March 11, a flock of thirteen; 23rd, about a hundred. These flocks arrived during the night, and left during the day; Nov. 30, one. *Outer Hebrides*—Flannans, March 4, three; 12th, eight; April 3, three, one killed. Island Glass, Oct. 27, nine, rested from 9 A.M. till 2 P.M., flew S.W. *Argyll and Isles*—Skerryvore, March 17, resting on rock; July 10, a flock flying past, going S.E. Dhuheartach, Nov. 6, two on rock.

(*To be continued.*)

ON THE AVIFAUNA OF THE OUTER HEBRIDES, 1888-1902.

By J. A. Harvie-Brown.

Introductory.

Before speaking of certain information regarding the fauna of these islands which has come to my knowledge since the date of the publication of the "Fauna of the Outer Hebrides," I desire to give a short *résumé* of the opportunities I enjoyed when studying the fauna preparatory to the issue of that volume.

In 1870 Colonel H. W. Feilden and the present writer worked certain of the islands of the group, including part of the Long Island, which is composed of Harris and Lewis. The following islands were very fully investigated, viz. :— Harris, where I (by the permission of Lord Dunmore) visited several eyries of golden and white-tailed eagles ; North Uist, where we spent our time at Lochmaddy and at Newton. We then travelled southwards, and spent a week at Balranald, principally for the purpose of seeing certain rare species in their known nesting haunts. After this was accomplished, and other work done, we took steamer to Castlebay, Barra, where we secured the use of the long-boat with its crew, which carried the letters to the lighthouse on Barra Head. Three days were spent at the lighthouse, and a knowledge was obtained of the rock-fowls which inhabited its cliffs ; and we also visited the adjoining island of Mingulay, an even more interesting spot. Returning to Castlebay, Barra, we were afterwards landed at the south end of South Uist at Polachar, were driven on to Grogary, where we spent some weeks, and Feilden remained about ten days longer after I was obliged to return home.

While at Nunton, in Benbecula, Feilden spent one whole day upon the island of Wiay, having been tempted to do so by the report that the Buffon's Skua bred there. He describes that walk as the hardest bit of work he did in the isles, and as about the most unremunerative. So much, then, regarding my earliest experiences of the group.

In 1879 I resided for several weeks at Newton, North

Uist, and on leaving North Uist went across the Sound of Harris to Obb, and awaited the arrival of the s.s. *Dunara Castle*, which touches there *en route* for St. Kilda. In company of my old friend Professor Heddle, I visited St. Kilda and also the Shiant Islands for the first time.

In 1881, in the yawl *Crusader*, I devoted most of my time to an inspection of the islands lying off the west coast of Lewis and Harris, and the Hysgeir group off North Uist, in the company of Dr. Underhill, and—after the 6th June—of Dr. Heddle. During this time—about five weeks—the Flannan Isles were visited.

In June 1885 I visited North Rona in company with Mr. Hugh G. Barclay, of Norwich, in a wretched tub of a river steam-yacht called *Eunice*. We reached Rona on the third attempt.

In 1886 I again visited the Outer Hebrides for some weeks, and stayed at Newton, North Uist; visited Obb and Rodel, and drove on through North Harris and Lewis to Stornoway, intending to join Barrington in my second visit to North Rona; but I was too late, and went across to Loch Inver instead.

In the year 1887, the yacht *Shiantelle* was built at Fraserburgh, in time to reach out to the isles of Stack-and-Skerry, North Rona,[1] and Souliskerry. During six years the *Shiantelle* was used in company with my friend the late Professor Heddle (who studied the mineralogy of the many localities visited) and Mr. Norrie, photo-artist, of Fraserburgh (who accompanied us for the purpose of obtaining illustrative views of the places we went to, with the intention of supplying illustrations for future volumes of our "Vertebrate Fauna of Scotland"). Very minute attention, during these cruises, was given to the verification of previous notes. Indeed, the object of building the yacht was to inspect and verify, as well as to add to our knowledge of these most interesting isles, and of the west of Scotland generally.

Since these objects were attained, and other isles visited, and the *Shiantelle* was sold, I have made short visits to

[1] I am assured, on the best authority, that no one has resided upon North Rona "for many years"; *i.e.* probably not since the circumstances related in our original account were detailed.

the isles (since the publication of our "Fauna of the Outer Hebrides"), but beyond keeping in touch with old friends and localities, I did not do much fresh surveying. The last of these short visits was in company with my friend H. E. Dresser in 1896, when he and I made the usual round in the s.s. *Dunara Castle*. Even then opportunities were not awanting for verification in many respects.

We had been assisted in a very appreciable way by much correspondence, and by all the lighthouse returns for some nine years. After the issue of our volume on the Outer Hebrides, other areas demanding more of our attention, Buckley and I devoted more time to these; but of late I have again been in correspondence with old friends in the Outer Isles, and I propose to say a few words regarding the changes that have taken place there since the issue of the second volume of our series, viz. in 1888.

Now, when Feilden and I first worked certain islands we could hear of none of the following species breeding within the group, or otherwise possessed only vague and unreliable information regarding them. Thus, we could never hear of any of the Lesser Terns breeding anywhere in the Outer Hebrides. Red-necked Phalaropes were undergoing a transition stage as regards their numbers, which, however, had always wavered between plenty and scarcity. They were in those days also much more restricted, probably in numbers, and certainly in haunts. Previous to our visit in 1870, H. G. Elwes in 1869 found many more nesting at one locality than we did only a year afterwards at the same place.

At that time also we could hear nothing about the nesting of the Pochard at any of the places where we resided or worked around. Nor did we recognise the Scaup-duck as breeding anywhere within the area. In the second part of this paper I intend to endeavour to bring up to date as far as I can any changes that have come to my knowledge in the species found breeding in the islands: and I will bring up to date all records of the rarer species already chronicled in various places, and especially such as are placed on a good footing in the pages of our "Annals of Scottish Natural History," where from time to time these have been inserted, and others which have been found authentic, and

have been recorded as being so in the reports to the British Association Migration Committee.[1] All the materials considered worthy, which appeared in the nine earlier "Migration Reports," had been utilised to the date of the issue of the "Fauna of the Outer Hebrides" in 1888. Since 1888 also —the date of the publication of the ninth report—subsequent analyses of the later schedules have appeared in the "Annals," under the editorship of Mr. Hinxman and Mr. Laidlaw.

Our thanks are due to those whose interest in the fauna of the Outer Hebrides has been kept up, and may have been stimulated, by our faunal works.

Amongst these, we desire to greet our good friend Dr. John M'Rury, a native of the island of Benbecula, whose continuous zeal in observation in Barra for some nine years, where he was also assisted by the Macgillivrays of Eoligary, has greatly extended our knowledge of the bird-fauna of that island. His papers in the "Annals" are very fully referred to in this list and notes.

An account of the Flannan Isles will be found in the "Scotsman" of 29th December 1900, by "S. M. F.," who visited the islands since the lighthouse was erected. As will be seen in the "Annals," our migration committee have received several schedules from the Flannan Isles, and some of the records will be found in this account.

The diary of a short residence on St. Kilda, by my friend the late Mr. J. Young, is in my hands. Some notes therefrom will be found below. At the same time, the Brothers Kearton were at St. Kilda, doing beautiful work with camera and note-book, as may be realised by consulting the results in their series of published works, and especially in "With Nature and a Camera," where an excellent account of "St. Kilda and its People" is given in the first chapter, followed by two chapters upon the "Birds and Fowlers of St. Kilda."

Mr. J. Steele-Elliott spent some three weeks of June 1894

[1] I have examined the only volume of a periodical named "The Scottish Journal of Natural History," published between January and May 1890. It contains nothing relating to the birds of the Outer Hebrides. I have also examined the volumes of the "Scottish Naturalist" for records prior to the date of the issue of the "Fauna of the Outer Hebrides," viz. 1887-88, 1889-90, and 1891, and found nothing of importance.

in St. Kilda, and published an account of the visit in the "Zoologist" (August 1895). The most interesting result was the finding of the Subalpine Warbler (*Sylvia subalpina*), and some recent notes upon the St. Kildian Wren. He also tells us that the factor receives about 200 stones (24 lbs. to a St. Kildian stone) of feathers from these islands yearly; and it takes about 450 puffins to make a stone of feathers. Mr. Steele-Elliott does not consider that there is any great force of Manx Shearwaters on the islands of the group, but he was only judging from the small numbers which he himself had seen at night, and from the fact of the natives only obtaining one egg during his visit. The most of these birds are found upon Soa and Boreray, and the Dune—islands most difficult of access from the main island, and only visited on comparatively rare occasions. It seems a great pity that so many of the Fork-tailed Petrels are taken along with the eggs, owing to the long-sighted policy of greedy collectors, and the short-sightedness and greediness of the natives, sorely tempted as they are.

Since Dr. M'Rury left Barra, Mr. W. L. MacGillivray kept some notes made upon the migratory birds he observed there in August and September 1901, and has sent these to me, along with notes of specimens in his collection which are not included in the records of our "Annals."

In 1895 the late Mr. J. Young made a hurried run across Skye to Dunvegan. Mr. Young obtained, amongst other information, the items regarding the practice of the natives with regard to their work among the rocks when obtaining feathers and food, partly to pay rents in kind, and partly to supply their own requirements. The St. Kildians divide their shares of the rents, etc., into sixteen shares as follows.

Each share represents the following numbers of birds :—

		Totals.
80 Gannets (young)	1280	3,200
120 „ (old)	1920	
560 Fulmars		8,960
120 Guillemots		1,920
50 Razorbills		800
600 Puffins		9,600
Total birds		24,480

The above—in the first column—is the number of birds killed by each of the sixteen bodies of shareholders, and multiplied by sixteen gives the totals in the second column. The flesh is for the winter supply of food for a population of about seventy souls, and the feathers represent the "rent in kind," or such portion of the rent so paid.

Notwithstanding the annual slaughter—to take only one example—Fulmars are increasing to such an extent that they have been found (quite of recent years) extending their breeding range to several suitable resorts, such as Foula, etc. But it must also be remembered that the St. Kildians are not now so utterly dependent upon their raids on the birds as formerly, because they are much better supplied with many luxuries, and it has become less necessary for them to "go to the rocks."

I have also to express my thanks to Mr. G. W. Hartley, who spent one winter shooting season (1898-99) in North Uist, and contributed an interesting account of the experiences of his party there to the 1000th number of "Blackwood's Magazine" (special double number, pp. 413-426). He kindly sent me his notes, with permission to use them freely.

In the descriptive portion of our "Fauna of the Outer Hebrides," we spoke of the various species of wild-fowl which had been introduced in South Harris by Lord Dunmore (*loc. cit.* p. lix). At the present time there is a somewhat melancholy interest attaching to these forlorn birds. Mr. Finlayson, gamekeeper, writing to me in the spring of 1901, says that very little interest is now taken in these fowls. The feeding has been stopped all during the shooting season, and no one was paid to look after them. But after the season was over he fed them, and got some to return, but found many others dead about the island. Many had been, no doubt, wounded at sea. Thus, of the large flock of half-tame Grey-lag Geese which used to be safe at Rodel, only some seven remained in the spring of 1901. Of the foreign wild-fowl introduced at Rodel, all had disappeared; most of them died, and the rest escaped.

Of the other birds generally it is stated :—"Eagles are scarcer. There have been none at one old haunt in South

Harris (*i.e.* since 1888), but a pair are still frequenting another old eyrie.[1]

"Grouse are scarcer—much scarcer for some years. We used to kill from 250 to 350 brace; these last few years only about 100 brace. Fifteen brace were brought to be put down last year by Colonel Pearcy, the tenant, and none are to be shot in 1901.

"Snipe as usual, but Woodcock not one for six." They have never recovered from the hard winter of 1894-95. Mallard about the same. Deer are increasing in numbers, but decreasing in weight.

It now, I think, only remains for me to mention the visits paid to that lone rock in the North Atlantic—viz. Rockall. The limited fauna of that outlying isle might almost be considered quite apart from the group of the Outer Hebrides; but, as Buckley and I did treat of it in our "Fauna of the Outer Hebrides," I may be allowed again to refer to it here. I only do so, however, in so far as seems needful, viz. to refer my readers to the list of twenty species which were observed there by the expedition in the Congested Districts and Fishery Commissioners of Ireland, s.s. *Granuaille* upon that occasion.

Shortly, then, the eighteen species observed were as follows:—Gannet, Dunlin, Whimbrel, Lesser Tern, Lesser B. B. Gull, Herring Gull, Common Gull, Kittiwake, Great Skua, Pomatorhine Skua, Richardson Skua, Razorbill, Guillemot, Puffin, Fulmar, Great Shearwater, Manx Shearwater, Storm Petrel.

The irresponsible records of the breeding at Rockall of the Brünnich's Guillemot and of the Little Auk have been banished from the worthier accounts of Rockall, as utterly untenable (see "Annals" for 1892, p. 197).

So far as our knowledge went of the species at that time, a very full account of the Great Shearwater will be found in the paper referred to.[2]

[1] But other accounts rather tend to encourage the hope, if not the belief, that there are some indications of a revival amongst the numbers of this fine species.

[2] Reports, VI. "On the Ornithology of Rockall," by J. A. Harvie-Brown and R. M. Barrington, members of the British Ornithologists' Union, "Trans. Royal Irish Academy," vol. xxxi. Part iii. pp. 66-75, Pls. ix., x., xi.; and also of the former history of the Rock, by T. Rupert Jones (*loc. cit.* pp. 89-98). A popular account of the expedition is given by Lloyd Praeger in "The Irish Naturalist."

I have recently received a most interesting and full account of matters connected with the south-western portions of the Lews from Mrs. Platt, whose husband has been the long-time tenant of the deer-forest of the "Park of Lewis." I am glad to say this sets at rest certain anxiety about some, at least, of our rarer species.

I am indebted also to Mr. A. M. Chance of Birmingham for a list of the birds seen in the island of Benbecula, during a short visit paid by him to that island of the group in June 1896; and perhaps an interesting point is that he does not mention having met with the Common Tern (*Sterna fluviatilis*), while assuring me that he looked carefully for it.

I have also received a most excellent running commentary upon our volume from Mr. Andrew M'Elfrish, Sheriff-Clerk of Lochmaddy, whose fifteen years' experiences of the islands, and his keen interest in all things relating to birds and sport, leave very little information ungleaned during these years, as regards the birds which come under the sportsman's notice. He has most ungrudgingly placed all these notes at my disposal for the purposes of this compilation.

In the November number of "The Zoologist" (1901) is a short and rather inaccurate notice of the Shiant Isles, apparently written from memory.

Mr. C. V. A. Peel, who has spent several years as a sportsman in Lewis, North Uist, Benbecula, and Barra, and who informs me that he has an account of his experiences in the press, which will shortly be published, has most kindly sent me a very interesting chronological sequence of his bird-notes. His own full account will be included in his book, which may probably see the light before this account of mine does.[1]

When our readers consider this appendix and compare it with the "Fauna of the Outer Hebrides," I think it is very likely that some may believe that much must have been missed by us before, when so many species have been added to the list since; but it will be allowed, I think, that most of these species are such as could only be added by a resident on the islands all the year round, or by the records of our reporters at the lighthouses, and by those sportsmen who

[1] Since issued, December 1901.

have carried into these wilds the gifts of observation, and inclination to observe other birds than those which were the immediate objects of their chase. And to many of these gentlemen my thanks are very great indeed ; and had it not been for their frank and hearty co-operation, and the records given from time to time in our "Annals," I could not have detailed so many excellent additions to our "Fauna of the Outer Hebrides."

Amongst others already mentioned above, I desire to record my thanks to Mr. Radclyffe Waters, whose experience of the Lews extends over the shooting seasons of 1890 to 1895 inclusive, and his notes refer to the localities of Galson and Gress in Lewis, which together march with Barvas in the west.

Still later, I have been allowed to read over the late Mr. Alfred Chapman's diary of his short collecting visit to North Uist, this having been most kindly placed at my disposal for the purposes of this account by his brother, Mr. Abel C. Chapman ; and the latter gentleman also has supplemented his kindness by sending me his own notes, made in the islands during a visit he paid during the shooting season of 1899.

List of Vermin Killed.

I have not obtained full lists of vermin from the isles ; but perhaps the following, which were killed upon Eishken, in the "Park of Lewis," by the head-keeper and seven assistants in 1898-1899, may be usefully reproduced :—

Cats	38
Old Crows	52
Young Crows	11
Old Hawks	11
Young Hawks	16
Old Ravens	21
Young Ravens	29
Peregrines	2
Falcons ? (by J. Ross)	3
Rats	234
	417

(*To be continued.*)

THE SERPENTS OF SCOTLAND AND THEIR STUDY.

By Gerald Leighton, M.D.

I am inclined to think that the Order Ophidia or Serpents is not a popular subject of study with Scottish field naturalists. I have several reasons for that belief, one being that any reference to this branch of the fauna in the "Annals" is a somewhat rare occurrence; another being that I have found it a matter of the greatest difficulty to obtain reliable information about the Order in Scotland. I do not think one need look very far to account for this; it is doubtless due to the fact that the sole Scottish representative of the Order of Serpents is a venomous species, viz. *Vipera berus*, the Adder or Viper, and to the corollary of that fact—which I think will be undisputed—that extremely few field naturalists care about having anything more than a passing acquaintance with venomous reptiles. This explanation brings me at once to the point of this paper, which is, that of the Distribution of the Order Ophidia with special reference to Scotland.

The distribution of snakes in the British Isles is a very interesting one, and in order to appreciate the position of Scotland we must notice that of the other parts of the area. More than that, it is necessary to make some attempt to account for the occurrence of serpents at all in the British Isles, and for their absence in some restricted parts. There are some hundreds of species of existing serpents in various parts of the world, but of these three only are found indigenous in the British Isles, and these three are confined to England, Wales, and Scotland, there being no snakes in Ireland, where the Class Reptilia is represented only by the Order Lacertilia, or Lizards. A few miles away on the Continental side of the British Channel some thirty species of serpents are found. Is it possible, then, to throw any light on the very restricted distribution of this Order in these Isles? Without in any way wishing to be dogmatic, probably some such reasoning as the following must be held

accountable. The serpents, which in point of view of geological time are a comparatively modern type as seen at present, seem to have spread over Europe from East to West, the hardier species penetrating farther into the colder climes than those of more warmth-loving nature. Apparently only three species were on what is now Great Britain when that mass of land became separated from the Continental mainland. Ireland, it would appear, was already an island, and the sea proved an inseparable barrier to the progress of the snakes in that direction, to say nothing of St. Patrick. The Isle of Man, too, was in the same position probably, as there are no serpents there. Whether this at all represents what really occurred or not, the fact remains that three species comprise the British list of Ophidians. These species are :—

1. *Tropidonotus natrix*, the Ring Snake or Grass Snake.
2. *Coronella austriaca*, the Smooth Snake.
3. *Vipera berus*, the Adder or Viper.

The first two of these, the Ring Snake and the Smooth Snake, are essentially lovers of warm climates ; the Ring Snake delighting to pass hours in the ponds of the south, not only because there it finds its chief food, frogs, but also for the simple delight of being in the water ; the Smooth Snake being an inhabitant of sandy plains and warm heaths, where it also finds its favourite food, the sand lizard (*Lacerta agilis*). The Adder, on the other hand, much less susceptible to cold, and with a more varied diet of small mammals particularly, is found far and wide, in every county of England and Wales, and almost universally distributed—of course in varying numbers—in Scotland. To the extreme north it is found, and I believe I am correct in saying that even in Sutherland Adders are as a rule to be found active after their winter hibernation, in the month of March.

Do the other two British serpents, then, never occur in Scotland ? It may be said with certainty, I think, that the Smooth Snake (*Coronella austriaca*) was never indigenous in Scotland, though it was supposed to have been recorded

under the name of *C. dumfrisiensis*, but the specimen was afterwards otherwise identified.

The case of *T. natrix*, the Ring or Grass Snake, is somewhat different, and a good many cases of this snake being found in Scotland are on record. These cases are of two kinds: (1) those which are obviously captures of snakes which have escaped from captivity (for this species is a very favourite vivarium pet), and (2) those which are genuinely indigenous captures. These latter are restricted to the south-eastern part of Scotland, viz. the counties of Roxburgh and Berwick. I do not know of any other part of the country where the Ring Snake is habitually observed, but should be glad to be corrected on this point if I am wrong.

Every now and then statements appear in the Press concerning the killing of snakes in parts of Scotland, which would seem to indicate that the specimens belonged to the Ringed species. Thus a writer in the "Scotsman," 21st June 1900, says that "serpents, not adders, of from 3 feet upwards are known in the Highlands. The biggest I have heard of was 4 feet 4 inches, killed by a Donald Macleod, shepherd, Cearbhaig, near Cape Wrath." This is a fairly circumstantial statement, and if the measurement is correct the reptile was probably a *T. natrix*. Unfortunately these statements, as a rule, turn out upon investigation to be untrustworthy. The measurements of snakes, unless made by a tape measure, have a marvellous knack of doubling themselves in a very short time, and extemely few people can estimate the length of a snake accurately by the eye.

After careful consideration of the evidence of the Ring Snake ever having been indigenous in Scotland, Mr. Wm. Evans comes to the conclusion that "although probably at one time a native of the Lowlands of Scotland (including the Lothians), the Ringed Snake does not now exist there as an indigenous animal. As an escape, or an introduced species it may, no doubt, now and again manage to establish itself in a way, but only, I fear, for a comparatively brief period at the best." [1]

The Ring Snake is so commonly kept in captivity that

[1] "British Serpents," pp. 355, 356.

it is not surprising to find specimens captured now and then in cities, sometimes in very curious places. Such a case occurred in Leeds in 1901 when a specimen was taken in a chapel! Two cases of this species being taken in Edinburgh are on record, one in July 1892, when the snake was found on a footpath near Haymarket, and a second in a garden at the Grange in September 1893. The first of these two was examined by Mr. Eagle Clarke, who found that it was a variety of *T. natrix* often seen on the Continent; the second was the common English type.

The distribution of the Scottish serpent, the Adder, in the islands round the coast is most interesting, and suggests matter for inquiry. It is found in Arran, but perhaps most abundantly in Mull and Jura. Curiously enough, however, there are no Adders in Iona, although a very narrow stretch of water separates this island from Mull. Tradition tells us that St. Columba banished all reptiles and other undesirable animals from Iona, and a most interesting account is given by Rev. Dr. Alexander Stewart of the fate of the only Adder known to reach those protected shores. Mr. Ritchie on one occasion noticed something swimming towards the shore. When it landed, and after a short rest, the creature wriggled on to the grass land, then suddenly stopped, and in a moment was dead! An unromantic zoologist would in all probability conclude that the Adder died from exhaustion from the effort of swimming to land, unaccustomed as this species is to taking active exercise in the water, but the more emotional inhabitants of Iona, naturally enough, preferred to attribute the fate of the venomous beast to the blessing conferred on their soil by St. Columba's decree. The biological interest of the incident is that it seems to establish at least one instance of an Adder being observed swimming, a feat which the writer has never seen himself in spite of much watching. Indeed, I have never caught an Adder in any circumstances which would point to the reptile taking to water, either for food or enjoyment; the harmless Ring Snake, on the other hand, delights in that element.

There is a small venomous serpent found in some English counties called the Small Red Viper. This reptile is regarded by authorities as a variety of the Common

Adder, not as a valid species, a view that does not commend itself to me. But as long as serpents are classified—as far as external characters go—by the arrangement and number of their scales alone, so long must the Small Red Viper be an Adder, in spite of the fact that it never attains the size of an adult Adder, is always of a reddish or mahogany colour, both sexes exhibiting this red tint (never seen in male Adders), and has a very limited distribution. This Small Red Viper is said to occur in some parts of Scotland, but I have been unable to obtain any Scottish specimens of it, and would be very grateful for any that field naturalists could obtain in the coming spring and summer. It is said by some to be merely the young female Adder, but, as I have said, both sexes are found of the same size and colour.

Another serpent that is a true variety of Adder is found in Scotland perhaps more often than elsewhere, viz. the Black Adder, or *Coluber praester* of some writers. In this reptile the colour is black all over, the zig-zag markings being only visible in certain lights or in preserved specimens. This melanism in Adders has been carefully worked out by Mr. Boulenger, who finds that it is produced differently in the two sexes. In the males—which, it may be remembered, exhibit the blackest markings in ordinary Adders—the black colour is produced by a gradual extension of these markings until the whole body is covered. In the females it is the ground colour, not the markings, which gradually deepens in tint, finally absorbing the markings in a universal black body. These black Adders are extremely rare in England, and any specimens taken in Scotland should be carefully preserved and recorded in the "Annals."

The local variations of the Scottish Adder in such matters as size, colour, food, numbers, time of hibernation, etc., afford great scope for original work on the part of field naturalists—a scope, indeed, hardly to be found in any other natural order which is fairly accessible to observation. Such problems as the following are all more or less awaiting solution, and many others of a like nature.

How do the Adders of Mull and Jura compare in the above points with those of Perthshire? Is there anything in the food-supply to account for the immunity of Iona from

Adders? Has any one ever seen an Adder swimming in the water, and captured the specimen? What do the young Adders feed upon up to the time that their jaws are large enough to swallow small mice and other mammals? What becomes of the young Adders from their birth to the time they are fifteen inches long, for no one ever sees them? How long do Adders live? What animals, if any, habitually prey upon them? Is there any evidence of the existence of parental relationship in Adders?

In almost any other Order of animals in our fauna—with the exception of the Fish—all such queries could be answered without much difficulty. In the case of adders, one has only to ask almost any question on their life-history to get—no answer. Surely, then, field naturalists (for they only can find the solutions of such problems) might turn their attention to this much neglected branch of Scottish Natural History, always remembering that in the case of the adder it is well to temper valour with discretion.

ADDITIONS TO THE FLORA OF BUCHAN.

By James W. H. Trail, A.M., M.D., F.R.S., F.L.S.

(*Continued from p.* 50.)

Artemisia vulgaris, L.—Though very abundant near the fishing villages and towns in the north-east of Buchan, this is scarce elsewhere, its preference for fields and sides of roads indicating that man has aided in extending its range, and may have introduced it into Buchan.

Petasites albus, Gærtn.—Well established near the Manse of Cruden.

Mariana lactea, Hill.—93*, by the wayside in St. Fergus: probably a casual.

Cichorium Intybus, L.—Several plants in a grass-field at Bonnyton-hill, Aberdour.

Hieracium.—This genus is very poorly represented in Buchan, the only species at all common being *H. Pilosella* and *H. vulgatum*; and even they are hardly as common as I have seen them elsewhere.

H. anglicum, Fr., var. *longibracteatum*, F. J. Hanb.—93*, upper end of Millden in Longside. What appears to be a weak form of this was gathered in the Rinn of Afforsk in Gamrie, Banffshire (94).

H. Schmidtii, Tausch.—93*, upper end of Millden, Longside.

H. murorum, L. pt.—Not common.

H. rigidum, Hartm.—93*, upper end of Millden, Longside.

H. corymbosum, Fr.—93*, Ravenscraig Castle, Peterhead.

Vaccinium Vitis-idæa, L.—Local and scarce, in Den of Boddam, Peterhead, and at Laithers, Turriff.

Pyrola media, Sw.—Seen in Buchan only on a wooded bank near Riffin, in Fyvie; locally abundant.

P. minor, L.—In plantations near Boyndlie in Tyrie, near Mount Pleasant in west of Peterhead, and near Auquharney in Cruden; locally common.

Anagallis tenella, L.—Not uncommon on the coast of Pitsligo west of Rosehearty, and of Aberdour, nearly to Dundarg.

Gentiana Amarella, L.—Links of Rosehearty.

G. campestris, L.—The form met with on the coast of S. Aberdeen and in 93 and 94, so far as I have collected it, is that now distinguished as *G. baltica*, Murbeck.

Symphytum officinale, L.—The evidence of the dried specimen seen from Aberdour, as recorded by me in July, is insufficient to allow of this species being included in the Buchan flora, especially as the specimen is too imperfect to permit of certainty. I saw no trace of the plant in the parish in August.

Anchusa sempervirens, L.—Semi-naturalised in Aberdour, Tyrie, and Fraserburgh.

Omphalodes verna, Moench.—93*, naturalised in West Den, Peterhead.

Scrophularia nodosa, L.—Nowhere common; beside the Deveron here and there.

Veronica Tournefortii, C. Gmel.—Was observed in four additional parishes, *i.e.* in thirteen out of the twenty-four in North Aberdeen. It is frequently a common field-weed.

Utricularia vulgaris, L.—In bog-holes of an old peat-moss in Fyvie, north-east of the railway station.

U. intermedia, Hayne.—93*, in a swampy pool at Braefoot in Turriff, very near where I found *U. minor* in 1900. None of the three species has been seen in flower in Buchan.

Mentha piperita, L.—94*, well established in Gamrie and Alvah; also in fourteen parishes of North Aberdeen.

Thymus Serpyllum, L.—Quite common in a few localities; this is a scarce plant in most parts of Buchan, and I have noted its occurrence in only nine parishes of the twenty-six.

Teucrium Scorodonia, L.—Also a local plant, having been observed in only two parishes in 1900, but in six others in 1901. It is locally abundant on rough banks near streams.

Littorella juncea, Berg.—Has now been found in nine parishes of North Aberdeen.

Atriplex hastata, L.—Is not plentiful, but is pretty generally distributed.

A. laciniata, L.—93*, a few on the sandy beach near Rosehearty.

Rumex crispus × *domesticus* (= *propinquus*, Aresch.), *R. crispus* × *obtusifolius* (= *acutus*, L.), and *R. domesticus* × *obtusifolius* (= *conspersus*, Hartmann), were all found growing at Glasslaw in Aberdour, on waste ground, where the three parents were all plentiful, in close proximity to one another.

Euphorbia Peplus, L.—As a garden-weed, locally common, but not of general occurrence.

Salix repens, L.—Not a frequent species, though occasionally plentiful. Observed in only seven parishes.

Populus tremula, L.—In several localities, *e.g.* near the Bridge of Alvah; but the only locality in which I have seen it apparently native is beside the Water of Cruden, opposite Uppermill.

Elodea canadensis, Michx.—94*, abundant in the Deveron below Turriff. The lake at Pitfour, Old Deer, is very full of it.

Orchis mascula, L.—Locally plentiful on the coast of Cruden near Southend, and on the coast of Gamrie near Melrose.

Orchis maculata, L.—Among specimens collected in Aberdour are some that probably belong to *ericetorum*, Linton.

Habenaria viridis, R. Br.—Rosehearty Links.

Allium ursinum, L.—Den of Auchmedden.

Typha latifolia, L.—In several localities, *e.g.* in Lonmay, at Pitfour in Old Deer, at Plaidy in Turriff, and at Ashogle in Alvah, but introduced by man into each locality.

Sparganium simplex, Huds.—Near Fraserburgh.

S. affine, Schnizl.—Loch of Glasslaw, Aberdour; burn at Longside.

S. minimum, Fr.—93*, marshy pool at Braeside in Turriff.

Potamogeton polygonifolius, Pour., var. *cordifolius*, Chaix.—93*, in a ditch in East Den, Peterhead.

P. alpinus, Balb., var. *annulatus*, Balb.—93*, in a swampy pool at Ard Braes, Cruden.

P. obtusifolius, Mert. and Koch.—93*, lake at Pitfour, Old Deer.

P. pusillus, L.—Near Philorth, Fraserburgh.
var. *tenuissimus*, Koch.—Loch of Glasslaw.

P. filiformis, Nolte.—Meikle Loch of Slains.

Zannichellia.—93*. In a pool in the bed of the old canal of Strathbeg I found examples of this genus, which had not previously been found in Aberdeenshire. It shows characters intermediate between the named forms, inclining towards *polycarpa*, Nolte.

Scirpus pauciflorus, Lightf.—Local, but met with in three additional parishes.

S. setaceus, L.—Observed in various localities in five parishes.

S. lacustris, L.—Not found by me in Buchan, the plant recorded for it being *S. Tabernæmontani*, Gmel.

Carex dioica, L.—Scarce and local; found in 1901 in Aberdour and Cruden.

C. teretiuscula, Good.—93*, beside a small marshy pool on hill south of the Dhustrath, Aberdour. Some specimens show the spikelets widely separated, but most are quite typical.

C. paniculata, L.—Two large tussocks in the Dhustrath. Not seen elsewhere in Buchan.

C. remota, L.—93*, Den of Auchmedden, Aberdour; very local.

C. curta, Good.—Not frequent; gathered in Cruden, Longside, Aberdour, and King Edward.

C. Goodenowii, J. Gay, var. *juncella*, Fr.—93*, Den of Auchmedden.

C. limosa, L., *segr.*—93*, East Den, Peterhead; locally abundant.

C. pallescens, L.—93*, Den of Auchmedden; very local.

C. sylvatica, L.—93*, Den of Auchmedden; very local.

C. lævigata, Sm.—93*, Den of Pitnacalder, Aberdour; fairly common.

C. fulva, Good.—Rather infrequent.

C. flava, L. *agg.*—Very general.

Œderi, Ehrh. (*minor*, Towns.).—93*, near Cowfords, Aberdour.

cyperoides, *Marss.* (*Œderi*, aut.).—93*, beside Burn of Strathbeg in Lonmay; wet bare places on coast below Ironhill, Aberdour.

flava × *fulva* (= *xanthocarpa*, Degl.), with *cyperoides*, Marss.

Milium effusum, L.—Den of Auchmedden; seen nowhere else in Buchan.

Deschampsia discolor, Roem. and Schultz.—93*, moorland swamp above Clinterty, Aberdour.

Avena pratensis, L.—Very local in Buchan; observed only on the Kippit Hills in Slains, and on a brae inland a little from Cruden Bay.

Glyceria aquatica, Sm.—Abundant in patches along the Deveron.

Festuca sylvatica, Vill.—93*, Den of Auchmedden; very local.

Juniperus nana, Willd.—Den of Quingan, Aberdour. There is little doubt that the *J. communis* of other records from Aberdour is *J. nana*.

Asplenium Ruta-muraria, L.—The only habitat known in Buchan for this is the wall of the gardens near the ruined Abbey of Deer. It is still plentiful there.

Scolopendrium vulgare, Symons.—Once abundant in the Den of Auchmedden; this is now scarce there.

Polystichum Lonchitis, Roth.—On further inquiry I found that the dried specimen recorded by me in July from Aberdour was not from a wild plant, and that there was little evidence that the plant from which it was taken had been originally found in Buchan.

P. lobatum, Presl.—Common in Dens of Auchmedden and Troup.

Lastræa Oreopteris, Presl.—Very local; near Foresterhill in Aberdour, and in wood at Pitfour in Old Deer.

Phegopteris polypodioides, Fée.—93*, Den of Troup in Aberdour, as well as in Gamrie.

Ophioglossum vulgatum, L.—94*. I have seen an example from a grassy spot at Dubstones, in Gamrie.

Lycopodium Selago, L.—Extremely local in Buchan; found by me only on east side of Den of Boddam, in Peterhead.

L. clavatum, L.—A rare plant in Buchan. In 1901 found in a few places in Aberdour, and in Gamrie on the hills inclosing Troup Den.

Selaginella selaginoides, Gray.—Local. In 1901 found in one place in Aberdour, and not uncommonly in Crimond, near the south end of the Loch of Strathbeg.

Chara fragilis, Desv.—93*, burn and mill-dam at Cowfords, Aberdour.

var. *delicatula*, A. Br.—93*, Meikle Loch of Slains, on stony bottom in shallow water.

C. hispida, L.—93*, abundant in part of the old canal of Strathbeg, in Lonmay.

Nitella.—In a mill-dam near the old church of Aberdour grew masses of a *Nitella*, but no trace of reproductive bodies could be found on it. Mr. James Groves regards it as either *flexilis*, L., or *opaca*, Ag. Neither species is on record for North Aberdeen.

SUPPLEMENTARY NOTE TO "RECORDS OF SCOTTISH PLANTS FOR 1901," ADDITIONAL TO WATSON'S "TOPOGRAPHICAL BOTANY," 2nd Ed. (1883).

By Arthur Bennett, F.L.S.

The abbreviations, etc., are the same as in former records, viz. "Ann. S. N. H." = "Annals of Scottish Natural History"; "J. B." = "Journal of Botany"; *sp.* denotes that a specimen was sent me.

Owing to an unfortunate accident, the Records in the January issue were printed from an uncorrected proof; and thus several printer's errors occur in the paper, though fortunately not such as to vitiate the record. The same cause, however, led to the omission of certain species, which are given below to complete the lists.

93. North Aberdeen.

(Recorded by *Prof. Trail*, in "Ann. S. N. H.," 1902, pp. 97, 98, from specimens named by F. J. Hanbury, Esq., F.L.S.)

Hieracium anglicum, Fr., *var.* longibracteatum, F.J.H.
H. Schmidtii.
H. rigidum.
H. corymbosum.

98. Argyll.

(*Rev. E. S. Marshall*, in "Journ. Bot.," 1901, pp. 389-391).

Rubus sertiflorus.
Hieracium saxifragum, *var.* orimeles.
Carex Sadleri.

99. Dumbarton.

(*Rev. E. S. Marshall, l.c.*)

Rubus Rogersii.
R. nitidus.
R. sertiflorus.

100. Clyde Isles.

(*Rev. E. S. Marshall, l.c.*)

Rubus Rogersii.
R. dumnoniensis.
Callitriche autumnalis.
Arctium intermedium.
Gentiana baltica.
Euphrasia borealis.
E. brevipila.
E. scotica.
E. stricta.
Glyceria declinata, *Breb.* (=G. plicata, *var.* depauperata, *Crépin*).

NEW AND RARE SCOTTISH MOSSES.

By James Stirton, M.D., F.L.S., etc.

Since the publication in the number of the "Annals of Scottish Natural History" for January 1899, of a more precise description of *Dicranum Fergussoni*, detected for the second time near Carsaig, I have been fortunate in alighting on a small tuft of the original gathering of this moss in the Island of Mull. The exact spot is not now known, but it must have been in the neighbourhood of Ben More, probably on its lower slopes. In this tuft the stems are abundantly covered with the red tomentum. Two years ago I picked up the same moss near Tarbert in Harris in a more luxuriant condition, where the red tomentum was much more abundant, presenting in this respect very much the aspect of *D. Mühlenbeckii*. Indeed a closer inspection of the two mosses reveals the fact that *D. Fergussoni* has greater affinities to *D. Mühlenbeckii* than to *D. fuscescens*. In both there is abundance of osculating pores in the central portion of the pagina, a little up from the base of the leaf. The slender tubes connecting these pores are difficult to detect in either plant, but are rarely entirely absent. In *D. Mühlenbeckii* the teeth on the upper margins of the leaves, as well as on the back of the nerve in the same region, may be said to be spinuloso-serrate, but those of *D. Fergussoni* are blunt and distantly set, while those on the nerve degenerate into mere hyaline tubercles when, indeed, they are perceptible. In the former, also, the basal cells are much broader. A thin cross-section of the nerve of

D. Mühlenbeckii reveals a middle row of largish oval pellucid cells surrounded, back and front, by much minuter cells, while the corresponding minute cells in *D. Fergussoni* scarcely rise above the rank of stereïd cells. Lastly, in both mosses, the thin transparent membrane enveloping the paginal cells is often easily detected under the microscope. *D. Fergussoni* has also rather close affinities to *D. brevifolium* (Lindb.), a comparatively recently described moss.

Dr. Braithwaite and I spent, in August of last year, seventeen days on the west coast of the Island of Lewis, in the neighbourhood of Carloway. The result, so far as moss gathering was concerned, was very disappointing. Curiously enough, however, from indications given to us through Mr. Gibson, Rector of the Nicolson Institute, Stornoway, we were enabled to alight on what was, in all likelihood, Moore's original station for *Sphagnum Austini* (Sull.), and huge masses of the moss were secured. A somewhat laxer state of the same plant was discovered not more than two or three hundred yards from where we lodged. *Myurium Hebridarum* was also found in several localities; but, as Dr. Braithwaite has promised to write a paper on this moss and its curiously restricted area of growth and spread, I refrain from saying more. *Campylopus Shawii*, which, as I have already said in another number of the "Annals," is by far the most prevalent moss around Tarbert in Harris, only grows near Carloway in clumps at considerable distances from each other, and not more than four such stations were alighted on. What is still more extraordinary is the fact that not a patch of either *C. subcinereus* or *C. purpurascens* was seen. On the other hand, the forms of, and appearances assumed by, *C. brevipilus* were most astonishing and, accordingly, most perplexing. On this account I was tempted to collect huge supplies of this moss, but more than three-fourths were thrown away, and (what I am most sorry for) along with them, I fear, the only tuft of *D. Fergussoni* I had picked up. Amid all the diversity of form and colouring assumed by *C. brevipilus* in this otherwise bleak and monotonous country, there is one form which presents appearances so unlike the usual habit of the moss, and

which has, besides, minute structural differences as revealed by the microscope, that I cannot reconcile myself to its identification with any of the other forms. This condition is also so constant that the moss may be discriminated by the naked eye. In all these multifarious forms there is only one constant character, viz. the presence of groups of stereïd cells on *both* sides of the middle row of cells, which a thin section of the nerve reveals. This structure of the nerve, as is well known, is almost unique amongst the European *Campylopi*, and is reckoned of such importance by one or two bryologists as to warrant a separation of the moss into a new subgenus under name *Palinocraspis* (Lindb.). I may mention that in Lewis the vast majority of the forms of *C. brevipilus* are without hyaline hair-points.

Campylopus fulvoviridis forms often widely extended, very compact tufts, generally plane above, not convex, and, in a wettish state, nearly continuous in such a humid atmosphere, these tufts have a peculiar glistening appearance which attracts the eye at once, dark-green above, brownish, brownish-black, or even black below, with a few pale radicles, or at times with scarcely any; stems slender, simple or sparingly dichotomously branched; leaves rather crowded, erect or somewhat erecto-patent, not differing much in direction in a dry state, slender and flexile, narrowly lanceolate, nearly tubular above, shortish and but slightly acuminate, bluntish at the apex and toothed there and often down the margin, as well as presenting, very often, blunt hyaline teeth on the back of the nerve, muticous and without auricles; central basal cells hyaline, oblong or rhomboid or, at times, oblongo-hexagonal, 25 to 45 by 9 to 14 μ, narrower outwards, and near the margin from 5 to 10 rows of very narrow elongated cells—all this space hyaline, and sloping upwards at an acute angle to the margin, up from this all cells fully chlorophyllose, rhomboid or narrowly rhomboid, towards the apex cells smaller, rhomboid, oval, or frequently bluntly triangular, 10 to 17 by 5 to 7 μ; nerve thin, 27 to 36 μ thick, from one-third to a half the breadth of the leaf near the base, not bulging in the middle, tapering upwards, and slightly excurrent or, at times, scarcely so, section of the nerve shows three rows of

cells, the middle row of opaque, then pellucid cells, enlarging downwards from 6 to 12 μ, diam., on both sides of this row groups (at times large) of stereïd cells, anterior row of very small cells, especially near the middle of leaf, where they are often scarcely perceptible, enlarging a little downwards from 3 to 5 μ, posterior row of cells somewhat larger, also enlarging downwards, from 4 to 7 μ; towards the base of leaf the posterior cells appear close to posterior surface, as alternately slightly elevated and depressed. The *bulging* posterior cells, seen on the back of nerve from the apex downwards, are rather variable in this species, but, when fully developed, they may be said to vary from 9 to 6 μ in height, decreasing downwards, and often reach the middle of the leaf, where they degenerate into minute, opaque irregularities on the posterior surface of the nerve. Discovered in Harris, 1900, and a description published in January 1901.

Mollia Haggartii (Strn.).—Plants rather closely aggregated; stems simple or rarely divided upright, from $\frac{1}{8}$ to $\frac{1}{3}$ inch long, radiculose below, radicles pale, jointed and minutely papillose; leaves laxly disposed below, more closely set above and longer, closely incurved or circinato-incurved when dry, nearly straight and spreading when moistened, length from 1 to 1·5 mm., oblong or oblongo-spathulate, broad at apex and there deeply cucullate; surface strongly and coarsely papillose back and front, as well as on the margins which, around the blunt apex, may be said to be coarsely crenato-papillose, papillæ large, hemisphærical, from 4 to 6 μ in height; nerve near base pale, one-fourth to one-third the breadth of the leaf, narrowing upwards where the leaf is broadening, prominent on back, ceasing below the blunt apex, composed internally of cells irregularly disposed in 3 to 5 rows, papillose in front, nearly smooth behind, thickness from 50 to 65 μ; areolation of pagina in the lowest fourth, large, hyaline, exactly as is *Mollia tortuosa*, where also, the oblong cells slope up to a point on the margin, size of these cells, 40 to 70 by 8 to 11 μ; immediately above this space there is another narrow one of small clear cells, quickly succeeded by dense opaque, roundish-quadrate, obscure cells, strongly

papillose, 8 to 11 μ, diam. Pagina below unistratose, upwards bistratose *next nerve*, and in the upper third bistratose throughout, while the marginal cells are unistratose and crenate. Only antheridia with a few paraphyses have been twice detected, situated apparently in the lower portion of the stem.

A peculiarity is the very slow expansion of the leaves in water.

A curious moss—to me unique.

On the earth covering the exposed roots of fallen fir-trees in a decaying condition, near Killin, gathered by Mr. D. Haggart, Killin, in April 1900.

In 1864 I discovered on the "Cobbler," at the head of Loch Long, a moss which Mr. Wilson declared was merely a form of *Dicranum* (*Oncophorus*) *polycarpum*. I was struck at the time with the large areolation of the leaf, much larger than usual in members of this section. This year, near Killin, I alighted on the same moss with identical areolation. Curiously enough, near it grew *Weissia crispula*, presenting at first sight much the same appearance.

Oncophorus polycarpoides.—In rather loosely aggregated tufts, deep-green above, sordidly brown below; stems simple, dichotomously or fastigiately branched above; leaves small underneath, elongating upwards and clustering at the summit, mostly erect but slightly spreading when moist, crisped and contorted when dry, lanceolate-acuminate acute, not papillose, scarcely expanded at the somewhat sheathing base, recurved on the margin in the lower two-thirds, and more broadly so in the middle, plane towards the apex, which is coarsely and distantly toothed; nerve near the base 70 μ broad, tapering upwards and lost near the apex, prominent behind, soon turning brown, composed internally of three rows of cells, middle row (3 to 4), of large pellucid oval cells, 11 to 15 μ diam., with numerous stereïd cells on both aspects of this row, anterior and posterior rows of much smaller cells; areolation of pagina near the base of large rectangular pellucid cells, 30 to 50 by 13 to 18 μ, which gradually decrease transversely into the general areolation above, the cells of which are closely set, at first quadrate, in longitudinal series, in a green state compactly granular, lastly containing scattered granules and oil globules and then showing usually

the primordial utricles, size 16 to 25 by 11 to 15 μ, near apex somewhat smaller.

The general cell formation of *Onc. polycarpus* is rather irregular, and 8 to 12 μ, diam., while the cells near the base are narrower than in the present moss. The capsules seen are too old, but the characteristic red teeth of the genus are well preserved, while the other characters agree so far as they go, more especially in the inclined and furrowed capsules and absence of any struma. The immature capsules show a peculiar slender annulus just below the attachment to the seta.

Since writing the above I have ascertained that Mr. H. N. Dixon of Northampton has published a description of this same Oncophorus under the name *Cynodontium laxirete* (Dixon). This name has accordingly the priority. I have, however, resolved to retain my description, as it is much the fuller of the two, while Scottish students will be enabled to recognise the moss.

At this stage I am brought once more face to face with a difficulty which formerly perplexed me, viz. what is the genuine *Grimmia Doniana?* This moss is fairly common in Scotland, especially in the western half. The areolation of the base of the leaf, in specimens that have come under my observation, although in only one of the Continental or Norwegian specimens, is very singular, almost unique amongst the Grimmiæ. The cells of the lowest fifth or even fourth of the leaves are very large, long, and colourless, as well as diaphanous, and in size and appearance have a striking resemblance to those of *Barbula tortuosa* in the same relative situation. They are oblong, almost cylindrical, 50 to 90 by 9 to 12 μ, becoming, towards the margin, even longer and narrower, and often having a single or, occasionally, two marginal rows advancing farther up than the rest; upwards these cells merge gradually and tranversely into the dense, dark areolation of the rest of the leaf. All this holds true for the majority of the specimens, but I have others from several localities, notably from Rannoch and Broadford in Skye, in which the basal areolation is quite different. Strange to say, I have a small specimen from Mr. Gardner, author of a "Flora of Forfarshire," who is said to have got the moss from Don himself or, at least, from his more immediate

relatives. In this the areolation of the base agrees with that shown in the Broadford specimen.

Grimmia hemipolia.—Tufts small, convex, very dense and compact; stems mostly fastigiate, at times merely dichotomously branched; lower leaves ovate, small, often hairless, enlarging and elongating upwards, and ultimately forming a comal tuft with long denticulate hair-points, margin plane; nerve bulging behind, narrowly concave in front, showing, in cross-section, 3 rows of cells below, generally 2 above, narrow, about 45 μ in breadth below, widening a little upwards and then narrowing towards the apex; cells at central base nearly colourless, 30 to 45 by 6 to 8 μ, outwards much shorter, 13 to 18 μ in length, with from 3 to 6 marginal rows of cells, longer and hyaline, upwards shortly sinuose, 14 to 18 μ, quickly ending in the dark, obscure upper areolation, 7 to 9 μ in diameter; pagina unistratose below and about 14 μ in thickness, with occasionally one marginal transverse couple of cells, in upper third or thereby, with several transverse couples (2 to 5), and near apex almost entirely bistratose; capsule pale, elliptical on a longish pale seta extruded a little beyond the tips of the leaves, lid reddish with a longish paler, slender apiculus, calyptra mitræform scarcely extending beyond the base of the lid. Inflorescence monoicous, perigonia generally on a lateral branch, inner perigonial leaves blunter, hairless, and much more laxly and transparently areolated.

I am under the impression that Limprecht's description of the leaf-base of *Gr. Doniana* accords more with this than with the genuine plant, while Dr. Braithwaite's description of the same follows much on the same lines.

A recent closer investigation of the Grimmiæ from Tarbert in Harris has shown one which I had previously associated (doubtfully, I must confess) with *Grimmia sublurida* (Strn.) from the same locality. It has the general appearance of a rather coarse form of the latter, but a microscopic investigation of the leaves has revealed the presence of a finely and closely papillose condition of the upper third or even half of the leaf, while the hyaline acumen is also papillose, at least in its lower half. The papillæ are very minute, not more than 2 to 2.5 μ in height, and thus

quite unlike the large papillæ of *Grimmia canescens*, to which it can only, on other grounds, be distantly related. Besides, the tufts are compact, and the stems simple or only dichotomously branched, and have none of the nodulose ramifications so characteristic of *Gr. canescens*. A section of the nerve shows it prominent behind, but flattish, with two lateral obtuse angles. For purposes of reference I give to this moss the name *Grimmia papillulata*.

These peculiarities of structure are worthy of being recorded, whatever may ultimately be the fate of the moss as regards specific distinction.

I hold, besides, that a notification of any peculiarity of cell formation (and I have described several) will enable us to advance to a closer appreciation of the physiology of plants, and thence, probably, to a higher stage of our knowledge of the life-history of mosses, etc.

Under this heading allow me to propose to the readers of these papers a problem for solution, or rather for verification. The cell-formation of the pagina of *Amphoridium Mougeotii* has lately puzzled me, and hitherto I have not convinced myself of the accuracy of my observations. Each cell appears to me to be connected by 4, 6, 8, or even more very slender tubes with the 3 or 4 adjoining cells. This is a very common mountain moss in a barren state, but if any one wishes a small tuft I can readily supply him. I may state that I work with a power of 370 diameters.

I am anxious to put on record descriptions of two mosses secured, in the first instance, on Ben Lawers in 1864 or 1865, which have puzzled several botanists, inasmuch as each has given a different decision. For one of these mosses the original station is lost, and although I searched, on two subsequent occasions, elsewhere on the mountain, I failed in securing another specimen. This regret is, however, much lessened, seeing that I picked up last summer near Killin what must, in all likelihood, be reckoned the perfect and, accordingly, the better developed condition.

Hypnum provectum.—Dioicous ; prostrate, main stems often red-radiculose, sparsely divaricato-ramose, branches often arcuate at the tips and radiculose and rooting there, rather closely but irregularly pinnate ; leaves on main stems

widely spreading but scarcely squarrose, broadly cordate below, rather longly and slenderly acuminate, slightly decurrent at the base, striate or even sulcate when dry in the lower half, margin plane, minutely but distinctly serrated throughout, serratures formed by the sharply pointed cells; cells of general areolation long, sharp-pointed, and narrow, 50 to 80 by 4 to 6 μ, broader near the base, a little shorter and narrower towards apex, alar spaces well defined, of 4 to 9 longitudinal rows, cells ovate, concolorous, 20 to 30 by 8 to 11 μ; nerveless or very faintly two-nerved at the base; branch-leaves narrower, ovate-acuminate often slightly secund, not spreading so much, alar spaces not so well defined; perichætial leaves *paler*, closely imbricated, the outer with long, almost setaceous acumina, which are also widely spreading, inner much more shortly pointed, and more laxly areolated; seta smooth, strong, thick, and long, deep-red; capsule large, long, and arcuate, lid large, convexo-conical, with a longish sharp point. Spores brown, sphærical, smooth, 11 to 14 μ in diameter. Perigonia bud-like on the main or secondary stems, with leaves shorter and less pointed. Killin; close to streams, on boulders which are at times submerged.

There are only two capsules left, not quite ripe; accordingly the teeth cannot be examined. While the lid and seta are fully coloured, the capsules remain a deep green, although the spores within are brown and apparently fully formed.

The smaller form discovered on Ben Lawers grew intermingled with the very rare *Hylocomium Oakesii* in one of the most prolific spots on the mountain. Besides being smaller in every way, the stems are more closely and shortly pinnate, with the leaves on the main stems squarrose but not sulcate, and much more abruptly and longly acuminated.

Until more extended observations can be made, I shall name this a variety under the name *minusculum*.

With reference to the station on Ben Lawers, I feel constrained to state that on a subsequent visit I saw at a glance that plants of almost every description had been torn away from it, and nothing left except a few straggling grasses and a small tuft of *Alchemilla vulgaris*. That this obliteration was the work of a botanist scarcely admits of a doubt.

I have seen this spirit of extermination manifested elsewhere during my rambles on the mountains.

Conostomum (?) *extenuatum*.—Tufts small, dense, of a yellowish colour above, reddish below; stems red-radiculose, simple or sparingly branched; leaves small, upright, closely appressed to the stem both in a dry and wet state, but with the long apices slightly spreading, narrowly ovate, longly acuminate, not papillose, margin plane and entire; no auricles; nerve ultimately red, about one-fourth the breadth of the leaf near the base, longly excurrent and smooth, length of acumen 30 to 50 μ, while the length of the pagina proper is only about 90 μ; areolation of the pagina small, oblong, detached, and nearly the same throughout, 18 to 26 by 5 to 7 μ.

The variety of *Rhacomitrium heterostichum*, formerly described under the name *amblyphyllum*, turned up last year near Killin. It is characterised by its short, upright, simple or sparingly dichotomously branched stems, with only here and there the short, bud-like branches of the type, its broad, short leaves, length about four times the greatest breadth, as well as by their blunt apices, blunter even than those of *Grimmia pulvinata*.

Grimmia retracta (Strn.) and its variety *submutica* occur frequently on the southern shores of Loch Tay. They are known even in the field from *Gr. Hartmani* by their darker colour, by their leaves clustering in almost cuspidate form at the summits of the stems in a dry state, while those of *Gr. Hartmani* are straggling, almost divaricate. The pagina in the upper third in the former is nearly bistratose throughout, or interruptedly so, while the leaves of *Gr. Hartmani* in the same region are unistratose, with one, rarely two, transverse marginal couples of cells. The upper part of the leaf in *Gr. submutica* is often 3-stratose, and, although rarely, 4-stratose in single or double transverse series, intermingled, as it were, amongst the bistratose series much as in *Gr. trichophylla*. Accordingly, *submutica* may turn out to be a species proper.

Gymnostomum calcareum was found lately by Mr. D. Haggart on the mortar of walls near Killin. So far as I know, this is the first record of this moss for Scotland.

HEPATICÆ OF ARDLUI DISTRICT, LOCH LOMOND.

By Symers M. Macvicar.

I paid a short visit to this locality in the early part of July last year, chiefly for the purpose of seeing how far our peculiar western species were represented, and to search for the rare *Scapania nimbosa*, as its usual associate, *S. ornithopodioides*, has been known from the district for many years. I was unsuccessful in my search for the *Scapania*, but several other interesting species were found. That the flora should be of the western type was to be expected, and in this it differs greatly from the flora of the Killin and Strathyre districts, which are the nearest localities eastward which I have examined. It differs, however, from that of the west coast in having these species fewer in quantity and in number; but they were represented, although rare, by *Lejeunea ovata*, *L. microscopica*, *Clasmatocolea cuneifolia*, and *Plagiochila tridenticulata*. *Plagiochila spinulosa*, as a common plant in several forms, with *P. punctata* and *Lej. patens*, both rather common, gave a characteristic appearance to the ravines on the low ground; while the presence of *Mastigophora Woodsii*, and the frequency of *Jamesoniella Carringtoni*, *Jungermania orcadensis*, and *Acolea crenulata* is similar to what is found on the west coast. *Jamesoniella* occurred in greater quantity than in any other locality which I have visited. The places searched by me were the low ground about Ardlui and for a short distance up Glenfalloch, the Dubh-uisge burn to the waterfall, the north-east corrie of Ben Vorlich up to 2300 feet, and the ravine at the foot of this corrie. The birch zone ascends to about 1300 feet in the corrie, a few scattered trees reaching to 1500 feet. At the latter height *Saxifraga oppositifolia* and *S. stellaris* were first observed.

Ben Vorlich is composed of schistose rocks, which form a soil favourable for hepaticæ; but the igneous rocks of the Dubh-uisge burn are very bare. On the granite rocks of the latter the reddish colour which some species appear usually to take when on this formation was very noticeable in *Marsupella emarginata*.

Of species of interest previously found on Ben Vorlich, I have seen specimens of *Scapania ornithopodioides*, gathered by Gourlie and by the Rev. C. A. Johns, and *Jamesoniella*, gathered by Dr. Stirton. To the last botanist the credit is due of being the first to distinguish this species, it having been previously confused with *Nardia compressa*.

The species observed in the district were as follows :—

Frullania Tamarisci (*L.*).—Common on rocks and trees on the low ground; uncommon on the hill, ascending to 2200 feet.

F. fragilifolia, *Tayl.* — Rather common on the low ground, noticed generally on trees; on the hill at 2000 feet. *F. germana*, Tayl. On trees at Allt Dubh-uisge. *F. dilatata* (L.). Rather common on trees on the low ground; not seen on the hill.

Lejeunea ovata, *Tayl.*—Rare; on a rock at Allt Dubh-uisge.

L. serpyllifolia (*Dicks.*).—Very common on rocks in the ravines; uncommon on the hill, ascending to 2100 feet. *L. patens*, Lindb. Rather common in the more shaded parts of Ben Vorlich ravine, usually creeping among other species and mosses on rocks and trees; noticed on the hill at 2100 feet.

L. microscopica, *Tayl.*—Rare; in a few of the most shaded parts of Ben Vorlich ravine, creeping among other species on rocks.

Radula Lindbergii, *Gottsche.*—Rare; on the hill at 2000 feet.

R. complanata (*L.*).—Very little of this generally common species was seen; perhaps partly overlooked.

Pleurozia cochleariformis (*Weiss*).—Uncommon on the part of the hill visited; noted at 1500 feet.

Anthelia julacea (*L.*).—Very common on wet rocks on the hill, *c. fr.* at 2200 feet.

Herberta adunca (*Dicks.*).—Common on the hill on banks, among rocks and stones.

Mastigophora Woodsii (*Hook.*).—Very rare; a few stems among *Scapania ornithopodioides*. On a rocky bank at 2000 feet.

Blepharozia ciliaris (*L.*).—Frequent on the hill.

Trichocolea tomentella (*Ehrh.*).—Wet ground in the wood, Ardlui.

Blepharostoma trichophyllum (*L.*).—Observed on banks up to 2100 feet.

Lepidozia reptans (*L.*).—Ardlui. *L. setacea* (Web.). Very common on peaty banks at 1600 feet; not seen on the low ground.

Bazzania trilobata (*L.*).—Rare; Ben Vorlich ravine. *B. triangularis* (Schleich.). Very common on the hill on rocky banks.

Kantia trichomanis (*L.*).—Ardlui. *K. Sprengelii* (Mart.). Near Allt Dubh-uisge.

Cephalozia bicuspidata (*L.*).—Common; seen up to 2100 feet. *C. connivens* (Dicks.). On the hill at 2100 feet, *c. per.*

Hygrobiella laxifolia (*Hook.*).—In wet ground at 1400 feet and 1900 feet.

Scapania resupinata, *Dum.* — Common on the low ground in its compact form; rather common on the hill to 2300 feet, as the lax form, among other species and mosses. *S. subalpina* (Nees). On gravelly detritus at side of Allt Dubh-uisge; rather common on the hill. *S. nemorosa* (L.). Ardlui wood. *S. ornithopodioides* (With.). Uncommon; on moist places among rocks from 1800 to 2000 feet. *S. undulata* (L.). Common. *S. purpurascens* (Hook.). Very common in Ben Vorlich ravine. *S. intermedia*, Husn. Rare; Ben Vorlich ravine. *S. irrigua* (Nees). Marshy ground near the road, Ardlui.

Diplophyllum albicans (*L.*).—Very common. *D. Dicksoni* (Hook.). On a birch tree at 1100 feet, *c. per.*

Lophocolea cuspidata, Limpr. (?).—Ardlui. When without inflorescence this plant can hardly be distinguished with certainty from *L. bidentata* (L.).

Clasmatocolea cuneifolia (*Hook.*) *Spruce.*—Very rare; on a birch tree at the side of Ben Vorlich ravine. I have also found this rare species in Moidart, West Invernesshire, and in Glencoe.

Chiloscyphus polyanthus (*L.*).—Allt Dubh-uisge.

Mylia Taylori (*Hook.*).—Allt Dubh-uisge; very common on the hill from 1800 to 2300 feet. *M. anomala* (Hook.). Marked in my list as having been seen both on the low ground and on the hill.

Plagiochila asplenioides (*L.*).—Common on the low ground, especially as the form *P. Dillenii*, Tayl., on boulders in the ravines; the large form (*major*, Nees) occurs only on the low ground. *P. spinulosa* (Dicks.). Common in Ben Vorlich ravine; var. *inermis*, Carr., Allt Dubh-uisge. *P. punctata*, Tayl. Rather common in Ben Vorlich ravine. *P. tridenticulata* (Tayl.). Rare; Allt Dubh-uisge with *Lejeunea ovata.*

Jamesoniella Carringtoni (*Balf.*).—Common at about 1800 to 2000 feet, on grassy and rocky banks, frequently among *Rhacomitrium lanuginosum.*

Jungermania cordifolia, *Hook.*—Rare, 2000 feet, *c. per.* *J. pumila*, With. Side of stream in Ben Vorlich ravine. *J. riparia*, Tayl., Allt Dubh-uisge. *J. crenulata*, Sm., var. *gracillima* (Sm.). Banks, Ardlui. *J. autumnalis*, D. C. (*J. subapicalis*, Nees). On a stone in the wood near Allt Dubh-uisge, close to the road. *J. bantriensis*, Hook., var. *Muelleri* (Nees). Rare; in Ben Vorlich ravine. *J. ventricosa*, Dicks. Common. *J. Floerkii*, Web. and Mohr. Uncommon, at 2000 feet. *J. Lyoni*, Tayl. *J. polita*, Nees. On the bank of the stream below the waterfall, Ben Vorlich, at 1900 feet—an extension of range of this interesting species, which I had found the previous year on Ben Lawers as new to Britain. *J. incisa*, Schrad. Appeared to be less frequent than usual. *J. minuta*, Crantz. Seen in only one place, at 2100 feet. *J. orcadensis*, Hook. Very common on the hill. It occurs in great abundance at 1800 feet, with *Bazzania triangularis* and *Mylia Taylori*, on stony ground which is covered with *Vaccinium Myrtillus*.

Nardia hyalina (*Lyell.*).—Common at the side of streams on the low ground. *N. obovata* (Nees). Very little seen, and only on the hill at 2000 feet. *N. compressa* (Hook.). Side of stream at Allt Dubh-uisge. *N. scalaris* (Schrad.). Very common.

Marsupella emarginata (*Ehrh.*).—Very common. *M. Funckii* (Web. and Mohr.). On soil at roadside near Ardlui. *M. olivacea*, Spruce, on a rock at 1900 feet.

Acolea obtusa (*Lindb.*). Common; descends to 1100 feet. *A. concinnata* (Lightf.). Rare below 2300 feet. *A. crenulata* (Gottsche). On boulders, Allt Dubh-uisge; common on Ben Vorlich.

Saccogyna viticulosa (*Mich.*).—Rather common on rocks in the ravines of the low ground.

Blasia pusilla, *L.*—Wet rocks in Ben Vorlich ravine.

Pellia epiphylla (*L.*).—Common. *P. Neesiana* (Gottsche), Limpr. On wet ground in the wood between Ardlui and Allt Dubh-uisge.

Aneura ambrosioides (*Nees*), *Pears.*—Common in the ravines. *A. pinguis* (L.). Frequent on the low ground; rare on the hill, where it was noticed to 2200 feet.

Metzgeria hamata, *Lindb.*—Ben Vorlich ravine. *M. furcata* (L.). Frequent on trees. *M. conjugata*, Lindb. Frequent on rocks, more rarely on trees.

Conocephalus conicus (*L.*)—On wet rocks in the ravine.

Perissia commutata (*Lindenb.*).—Rare on the hill; *c. fr.* at 1900 feet.

ZOOLOGICAL NOTES.

Albino Shrew in Banffshire.—A specimen of an Albino Shrew (*Sorex vulgaris*, Linn.) from Kirkmichael, Ballindalloch, was presented to the Edinburgh Museum on 7th January 1902. The specimen, which is nearly 3 inches in length from the point of the snout to the tip of the tail, is almost pure white, only the top of the head and the back having a slight ashy tinge, while the tip of the tail is distinctly brown, the colour becoming paler as we proceed forwards towards the body. Albinism, though common in the mole, does not seem to be frequent among the shrews, as we in the Museum have never before seen a specimen showing that condition, nor do we know of any previous record.—R. H. Traquair.

Hedgehog in Argyllshire.—In connection with recent notes on this subject, I may say that I found a half-grown hedgehog in a wood adjoining the reservoir at the head of Glen Crutten on 18th July 1901, and that my brother Alexander, some weeks before, observed one in Glen More, close to Oban, and practically in the same locality as that mentioned by Mr. Watt.—Robert Godfrey, Edinburgh.

Occurrence of the Harp Seal in the north of Shetland.—The following observation was made by Thos. Anderson, Esq., of Hillswick, who relates it in a letter to me:—

"When on an excursion to the cliffs of Roeness Hill on 19th August 1901, I saw a Harp Seal in Langclodies Gio, lying on the rocks on the south side of the Gio. There were a large number of the ordinary seals, but this one took my notice by being lighter in colour, and when I looked at it with my glass, I could see the dark circular mark on its back quite clearly. Another seal was on the same rock but much darker in colour, a bluish-grey, and speckled, or dappled. The cliffs are 400 feet and the sea very heavy, so there was no chance of getting it. It is the first I have seen."

This note by Mr. Thomas Anderson, who is a very competent observer, adds another to the scanty records of the occasional occurrence of the Harp Seal (*Phoca grœnlandica*) in Scottish waters. The late Dr. Saxby stated that this seal is not very rare in Shetland during bad weather, and Mr. Harvie-Brown saw what he regarded as specimens in the Sound of Harris. No Scottish example seems to have been shot and preserved in any of our Museums. In the Museum in the town of Kendal, however, is a specimen captured in 1868 in Morecambe Bay, Lancashire, which was identified by Mr. Thomas Gough and myself as undoubtedly a specimen of the Harp Seal.—Wm. Turner, Edinburgh.

Goldfinch in King's Park, Edinburgh.—A Goldfinch (*Corduelis elegans*), in beautiful plumage, evidently an old ♂, was "trapped"

by a bird-catcher near Duddingston Loch on 13th February last.—T. G. Laidlaw, Edinburgh.

Further occurrence of Greenland Redpolls in Barra, Outer Hebrides.—I am again indebted to my friend Mr. W. L. Macgillivray for allowing me to examine and record two more specimens of the Greenland Redpoll from the Island of Barra. Both these examples were obtained by Mr. Macgillivray in September last, and are identical with the birds determined by me, in accordance with the views of American ornithologists, as the form known as *Acanthis linaria rostrata*, Coues ("Annals," 1901, pp. 131-133).

Since my last note, I sent one of the specimens then recorded to Professor Newton for his opinion upon it, and I now reproduce his views concerning it. I may say, however, that the specimen he kindly sent me for comparison agreed in every particular with the two other specimens not seen by Professor Newton.

Professor Newton's remarks are as follows: "I send you one of our Redpolls, a female, from Lichtenfels in Greenland, in newly-moulted autumn plumage, which you will admit agrees very closely with your bird, allowing for difference of sex, as I take yours to be a male. It came to me as *Linota linaria*, and was referred by me to *hornemanni*, after a long investigation which Mr. Dresser and I undertook. I still think that it is *hornemanni*, and I also believe that there is but one form found in Greenland. I think the Redpoll sent is sufficiently near your own specimen for you to refer both to the same form whatever you may call it, and as the locality (and season) of the former is known you may justifiably deduce the origin of the latter."—Wm. Eagle Clarke, Edinburgh.

Wheatear capturing a Moth on the wing.—The capture of Lepidoptera on the wing by birds is a subject that has been receiving some attention lately, and perhaps the following incident, which is not lacking in special interest, may be worthy of record. One day in mid-June last, while walking along the road which runs by the side of Loch Assynt, in north-west Sutherland, a male Oak Eggar moth dashed past me with the swift but unsteady flight characteristic of the species. Suddenly a male Wheatear gave chase, and after a short but trying pursuit, during which the bird several times failed to secure its prey, succeeded in making a capture, and ate its victim on the road, where I found the wings, the only remains left. If I had not witnessed this most interesting flight from start to finish, I would not have believed it possible that a Wheatear could have been so clever or so swift on the wing. I have also seen the Great Titmouse capture the common White Butterfly (*Pieris rapæ*) on the wing.—Wm. Eagle Clarke.

Waxwing in Edinburgh.—Referring to the occurrences of this bird in Scotland last November, recorded in the January number

of the "Annals" (*ante*, p. 52), I may mention that a male (apparently immature) was found lying dead in a garden in Abbotsford Crescent, Edinburgh, on the morning of 26th November.—WILLIAM EVANS, Edinburgh.

Great Spotted Woodpecker in Argyllshire.—A specimen of *Dendrocopus major* was shot in the coverts at Inverawe, Taynuilt, on the 17th of January last. It is a rare visitor in the west, and I have not had one sent to me during the past fourteen years.—C. H. BISSHOPP.

The occurrence of Tengmalm's Owl in Shetland. — On 5th November 1901 a fine female specimen of this rare visitor was shot in Shetland. The bird was first observed sitting under the shelter of a tuft of grass on a bleak hillside near a loch in the parish of Sandsting. When disturbed it took flight, but alighted about one hundred yards off, when it was again approached and shot. Possibly the strong north-east winds which prevailed here a week before it was discovered had something to do with its appearance in our Islands. The bird was given to Captain Ridland in the first instance, but on my informing him of its rarity he was led to present it to the collections in the Edinburgh Museum of Science and Art, where the specimen may now be seen.—ALEXANDER INKSTER, Reawick, Shetland.

[Tengmalm's Owl is an interesting addition to the fauna of the Shetland Islands. As a rare visitor from Northern Europe, this species has only on two previous occasions been detected in Scotland, although over a score have from time to time been obtained in England, chiefly in the north-eastern counties.—EDS.]

The Little Owl in Kincardineshire.—On 1st February a female Little Owl (*Athene noctua*) was shot at Blairs while hawking about in mid-day. It measured, from point of beak to tip of tail, 8½ inches. Expanse of wings 18 inches, and the closed wings fell half an inch short of the tail. Eyes bright straw-yellow. The bird was in excellent condition, and its stomach contained the beak and some other portions of a starling. At the publication of the last edition of Saunders's "Manual" in 1899 there was no record of this species for Scotland; and I am not aware of any occurrence since.—GEORGE SIM, Aberdeen.

The Black Kite in the Peterhead Museum.—In the "Annals" for 1901, p. 133, the Editors say, "We are informed that the Peterhead Museum has recently acquired a specimen of this bird from a local source. If this is a Scottish example we shall be glad to have full particulars." I am able to say that this example is *not* from a local source. It was sent as a dried skin from Bath to the person who sold it to the Museum. It is but fair to add that he did not represent it as a locally killed example.—GEORGE SIM, Aberdeen.

Honey Buzzards in Aberdeenshire.—On 23rd September 1901, an immature Honey Buzzard (*Pernis apivorus*) was shot near Port Erroll; and on the 30th of the same month another was obtained near Ellon.—George Sim, Aberdeen.

Grey-lag Geese in Wigtownshire.—On 18th January I shot a fine specimen of the Grey-lag Goose (*Anser cinereus*) near Wigtown Bay. It was one of several hundred I saw on that occasion. In the morning and early part of the day they frequented the grass fields, but during mid-day they were to be seen chiefly out on the mud flats, returning again to the fields as the light began to fade. Their movements, however, are probably considerably influenced by the state of the tide. On 25th February my brother found them still in the same locality in large numbers, and secured a second. These two weighed 8¼ and 8 lbs. respectively. From what I have been able to gather I am of opinion that the Grey-lag has been by far the most common species in the district this winter. Mr. Howard Saunders in his "Manual" states that "even in the Solway district the Grey-lag is seldom seen." It would be interesting to know how far this is correct as regards the Wigtownshire coast.—J. M'L. Marshall, Portpatrick.

Bean Goose in Galloway.—On 8th February the head keeper brought me two Bean Geese (*Anser segetum*) which he had shot in a turnip field above the village of Portpatrick. They were two out of a lot of three, and weighed 7 lbs. 2 ozs. and 5 lbs. respectively. Several other small lots of geese were reported to me as having been seen about the same time, but to what species they belonged I cannot say.—J. M'L. Marshall, Portpatrick.

Pintail breeding in Selkirkshire.—On the 15th of May 1901, while making a round of the lochs in the southern portion of Selkirkshire, I discovered a nest of the Pintail (*Dafila acuta*), and flushed the female off her eggs. I watched the bird and saw her join the male on the loch close at hand. I am very well acquainted with this species, having shot the bird many times in Berwickshire. I examined the birds carefully with my field-glasses, and there was no mistaking the species. I have reason to believe that this was not the only nest of the Pintail found in the district last season, for I have reliable information that a nest of seven eggs was discovered, and that five young hatched out, and were seen at the end of June or beginning of July, and were doing well.—W. Renton.

Snipe flocking in Benbecula.—Snipes (*Gallinago cælestis*) breed in these islands in considerable numbers every year. In September the foreigners begin to come, and flights continue to arrive during winter. In October 1899 I saw a most interesting sight as I was driving between Howmore in South Uist and Loch-

boisdale. I had only gone a short distance when I saw a great flock of birds flying towards me from the north. They came right up and almost over my head, and then began to fly round in circles, dropping until near the ground, and again rising, but still sweeping round in circles. They were snipes, and in hundreds. After they had behaved as described for perhaps half an hour, detachments of them broke off from the main body, and went away in various directions, until the whole had disappeared. I have never seen snipes in flocks like dunlins on the ooze, or fords. Occasionally in hard weather they may be seen about the shores, but never in flocks.—Andrew M'Elfrish, Lochmaddy.

Common Tern nesting in the Shetland Islands.—During last summer I received for identification several adults, young, and eggs of the Common Tern (*Sterna fluviatilis*) from a holm in an inland loch in western Shetland, where they were breeding in some numbers. I much wish that my correspondent would have sent a communication on this subject, because this bird has not hitherto been known as breeding species in the islands, but since he has failed to do so, I venture to make known the interesting fact myself, rather than it should longer remain unrecorded.—Wm. Eagle Clarke.

Adder taking to water.—Dr. Gerald Leighton in his suggestive paper in our present number asks for information on this subject. When fishing in Loch Coultrie, in west Ross-shire, in June 1892, I surprised an adder on the shore near to the water's edge. The reptile took the water to escape capture, and swam out a few yards, with apparent ease, and landed on a low flat-topped rock, whence I drove it back to the shore and secured it. If any of our readers have any information on this, or on the other points requiring elucidation mentioned by Dr. Leighton, I trust they will send their notes to the "Annals."—Wm. Eagle Clarke.

Spanish Bream on the Kincardine Coast.—On 3rd December 1901 a specimen of *Pagellus bogaraveo* was captured in a trawl six miles off Sod Head, and was brought into Aberdeen market. This is a southern form, and is of irregular occurrence in British seas, and I am not aware that it has been hitherto recorded for the north-east coast of Scotland.—G. Sim, Aberdeen.

Black Fish in the North Sea off Aberdeen.—In addition to the specimens of *Centrolophus niger* reported by Dr. Traquair in the January number of the "Annals," I may mention that one, 23.5 inches long, was caught twenty miles off Aberdeen on 30th April 1887, and is still in my possession. As Dr. Traquair had no opportunity of examining his example in a fresh state, so as to note its internal characters, perhaps space may be granted me for a few remarks on this subject. The number of vertebræ, 25; pyloric

appendages, 12—well developed and 4 inches long; small teeth in both jaws; on the palate are six hard patches, the posterior pair $\frac{1}{8}$-inch long, and extending into the œsophagus. These patches are beset with long, sharp, somewhat bent spines. Within the angle formed by the lower end of the gills lie two patches of a triangular form, the posterior ends of which are also set with sharp bent spines. Dr. Day says, "barbed teeth extend into the œsophagus," but my specimen had not a single barbed tooth. The great peculiarity in this fish is its possession of what may be called "cheek pouches," along which run longitudinally a number of ridges, each having a number of obtuse knobs upon them, and each knob is beset with sharp teeth. There are also, at the opening of these pouches, a number of strong thick plates which extend into each pocket and run half its length, but without the knobs, as on the ridges already mentioned. What is the function of those pouches? They are highly developed, their outer coat being thick and muscular, and they form a large lump immediately behind the gills. Do they act as grinders for the food? Of what does the food consist if it requires such organs for its preparation? The gill rakers are short and rather stout, the longest about $\frac{1}{2}$-inch, and set on their inner edge with long, sharp, rather weak spines. Each gill arch has, on both sides, a number of transverse bars, and each of them is set with many sharp, bent spines. Another peculiarity in this species is the porous spongy appearance of the vertebræ, which conveys the idea of feebleness. This feeling is further heightened by the weak attenuated condition of the spinous processes. Again, each vertebra is very deeply cupped, having only a slight partition in the centre. —George Sim.

Three-bearded Rockling in Shetland.—A specimen of the Three-bearded Rockling (*Motella tricirrata*, Bl.), measuring $17\frac{1}{2}$ inches in length, was presented to the Edinburgh Museum of Science and Art in January 1901 by Dr. Cameron Bowie of Clousta, by Bixter, Shetland, who obtained it from the sea in his immediate neighbourhood. This seems to be the first record for the Shetland Islands, as it is not mentioned in Evans and Buckley's work on the fauna of Shetland, nor is its occurrence in these islands noted in Day's "British Fishes," or in any other work which I have consulted.—R. H. Traquair.

Spinax niger and Chimæræ monstrosa in the Pentland Firth.—Mr. Alexander Meek, in his "Report on the Scientific Investigations, 1901" to the Northumberland Sea Fisheries Committee, records (p. 61) the capture of two interesting fishes, viz. *Spinax niger*, the Black Dog-Fish, and *Chimæræ monstrosa*, the "King of the Herrings," both captured in August last in the Pentland Firth. The former was identified by Dr. Ridewood, of the British Museum. Both specimens were females.

Greenland Shark in the Moray Firth.—On the 5th of February 1902 a Greenland Shark (*Læmargus microcephalus*), 10 feet long, was stranded near Burghead, and hooked and pulled ashore by Mr. Anderson, of that place. It was taken to the Elgin tanworks to be skinned. I saw it there and identified it: its teeth, narrow gill openings, and small pointed dorsal fins being unmistakable. Its last meal had been part of a porpoise or whale, as several pounds of undigested flesh like dark-coloured beef, taken from its stomach, indicated. As I know of no record of this species from the Moray Firth during the past ten years, I thought the occurrence might be worthy of a note in the "Annals."—Wm. Taylor, Lhanbryde.

Helix hortensis and Vertigo pygmæa in West Lothian.—Last July I found *Helix hortensis* fairly common in the valley of the Avon, from Linlithgow Bridge downwards. In one locality I counted twenty-seven broken adult specimens that had apparently been devoured by thrushes. Mr. Wm. Evans had previously found a single example of this shell at Philpstoun in June 1900.

Of *Vertigo pygmæa* I discovered a colony on some rough ground near Northbank Farm, Bo'ness, on 13th May 1901. I also took an adult specimen of this shell in a wall at Jinkaboot Mill on 6th June. —Robert Godfrey, Edinburgh.

BOTANICAL NOTES AND NEWS.

Three Galls on the Ash (*Fraxinus excelsior*).—I have found three forms of galls on this tree in the valley of the Dee that were not included among the forms described by me in former years.

(*a*) A twig remains short with the leaves crowded together, rather stunted, with pinnæ incurved, so as to form a roundish mass three or more inches in diameter. Wingless females and larvæ were present in the only two examples of this gall met with by me, at Murtle, a few miles from Aberdeen, early in June. They appeared to belong to the genus *Pemphigus*. The gall agrees with the description of the work of *P. nidificus*, F. Löw (? *P. fraxinifolii*, C. Thomas).

(*b*) A leaflet shows itself curled backwards in great part of its extent, and irregularly swollen and thickened, pale or veined with dull purple. In the space below the distorted leaflet lives a small tree-hopper—*Psyllopsis Fraxini*. This deformity is very common in most parts of the country.

(*c*) The inflorescences are changed into irregular masses like small cauliflowers, the flower-stalks becoming swollen, and the flowers aborting. The whole mass of such an inflorescence may be from one to two or more inches in diameter. At first soft, it ultimately

becomes hard and brown. This gall is the work of a mite—*Eriophyes Fraxini* (Karp.) Nal. It appears not to be common in the north of Scotland, where I have only twice met with it.—James W. H. Trail.

CURRENT LITERATURE.

The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—October-December 1901.

[The Editors desire assistance to enable them to make this Section as complete as possible. Contributions on the lines indicated will be most acceptable and will bear the initials of the Contributor. The Editors will have access to the sources of information undermentioned.]

ZOOLOGY.

A White Weasel in Fifeshire. J. M. S. *The Field*, 8th February 1902, p. 183.—Refers to a specimen trapped in the country in the winter of 1900-1901.

A Black Hare in Caithness. J. Anstey. *The Field*, 22nd February 1902, p. 281.—Specimen shot by one of the Duke of Portland's keepers.

Notes from Shetland. J. Edmondston Saxby. *Zoologist* (4), vol. v. pp. 112-113 (March 1902).—Relate to Coot, Long-eared Owl, Woodcock, Snowy Owl, Iceland Gull, Waxwing, Grouse, and others.

Kingfisher near Aberdeen. W. Wilson. *Zoologist* (4), vol. v. p. 27 (January 1902).—This note refers to the acquisition of a specimen on the Don, a few miles inland from Aberdeen, and to a second example which was picked up in a starving condition at Alford.

A White-winged Woodcock. F. G. B. *The Field*, 1st February 1902, p. 178. Specimen shot near Loch Awe with the first five primaries pure white, the sixth and seventh of the normal colour, and the eighth, ninth, and tenth pure white.

King-Eider in Fifeshire. Bernard B. Riviere. *Zoologist* (4), vol. v. p. 27 (January 1902).—Refers to a male shot on 15th June 1899.

The Conchology of the Clyde: Geographical and Biographical. By A. Somerville, B.Sc., F.L.S. *Journ. of Conchology*, vol. x. pp. 137-141 (January 1902).

Dragonflies in 1901. By W. J. Lucas, B.A., F.E.S. *Entomologist*, vol. xxxv. p. 33 (February 1902).—Several Scottish records are referred to.

Apatania muliebris, M'Lach. in Lanarkshire. Kenneth J. Morton. *Ent. Mo. Mag.* (2), vol. xiii. p. 10 (January 1902).—Taken almost every year for the last ten years during the month of May at the foot of Tinto Hill, South Lanarkshire.

BOTANY.

On the Distribution of certain Forest Trees in Scotland, as shown by the Investigation of Post-glacial Deposits. By Walter N. Niven. *Scot. Geogr. Mag.* xviii. 1902, pp. 24-29, with map.—This paper, read at the meeting of the British Association in 1902, is a summary of all information on the subject known to the author.

Botanical Notes of Excursion of Berwickshire Club, on 29th August 1900, to Gullane Links (*Hist. Berw. Nat. Club*, xvii. p. 240); and to Aikengall, Haddington (*l.c.* pp. 246, 247).

A Visit to Aikengall Dean in 1884, by Dr. Charles Stuart (*Hist. Berw. Nat. Club* xvii. pp. 269-274), followed by short list of plants from new localities in Berwickshire (*l.c.* p. 274).

On the Comparative State of the Flora of the West Highlands during the Eighteenth Century and at the Present Time. By Symers M. Macvicar. *Trans. Bot. Soc. Edin.* xxii. pp. 17-30.

Some Clydesdale and S.W. Ayrshire Plants. By Rev. W. Moyle Rogers, F.L.S. *Journ. Bot.* 1902, pp. 54-59.—Refers to Wigtown (74), Ayr (75), Argyll (98), and the Clyde Isles (100), enumerating a number of new county records, especially in genus *Rubus*.

Report of the Excursion of the Scottish Alpine Botanical Club to Killin in 1900, by Rev. David Paul, LL.D. (*Trans. Bot. Soc. Edin.* xxii. pp. 40, 41), and Supplementary Report on Mosses, by Llewellyn J. Cocks (*l.c.* pp. 41-45).—These reports mention the occurrence of numerous scarce and local species.

Ranunculus fluitans, Lam., var. Bachii, Wirtgen, recorded in *Bot. Exchange Club Report*, 1900, from two localities in N.E. Berwickshire (81), by Chas. Bailey.

Note on the British Distribution of Glaucium flavum, Crantz, the Horned Poppy. By Alex. Somerville, F.L.S. *Trans. Bot. Soc. Edin.* xxii. pp. 13-16.

Solanum rostratum, Dunal, in Britain. By J. F. Jeffrey. *Journ. Bot.* 1902, p. 42.—Found at Perth Harbour in September 1901 by Mr. Gray (and in two English localities by others), a casual.

ACROBOLBUS WILSONI (TAYL.), NEES, IN SCOTLAND, at Sunart, W. Inverness, in November 1901.

LEJEUNEA ROSETTIANA, MASSAL., IN SCOTLAND, in Pease Dene, Berwickshire.

} Both by S. M. Macvicar, *Journ. Bot.* 1902, p. 42.

ON THE FIRST RECORDED OCCURRENCE OF CHARA BALTICA IN SCOTLAND. By F. C. Crawford. *Trans. Bot. Soc. Edin.* xxii. p. 13. Found, on 31st August 1900, in Loch of Stennis, Orkney.

NOTE ON THE STAG'S FUNGUS. By William Forsyth, D.D. *Journ. Cairngorm Club*, 1902, pp. 373, 374.—Refers to occurrence of *Elaphomyces granulatus* in the forests of Upper Speyside, and to the local name, "Buntata-nan-earb," meaning "roe-deer's potatoes," in allusion to roe-deer digging it up as food.

THE CHANGES THAT TAKE PLACE IN PLANTS IN WILD AND CULTIVATED STATES. By Dr. Stuart. *Hist. Berw. Nat. Club*, xvii. pp. 275-282.—Largely a discussion of hybrids and other plants reared by Dr. Stuart at Chirnside.

BOOK NOTICES.

FAUNA, FLORA, AND GEOLOGY OF THE CLYDE AREA. Edited by G. F. Scott Elliot, Malcolm Laurie, and J. Barclay Murdoch. (Glasgow: James Maclehose and Sons, 1901.) 5s. net.

This handbook on the natural history of Glasgow and the west of Scotland was prepared for last year's meeting of the British Association. Its contents, so far as the flora is concerned, were alluded to in our last number. That portion which deals with the fauna now demands our attention. The zoological section comprises no less than 230 pages, and contains a marvellous amount of valuable information on all classes of animals, prepared with most painstaking and conscientious care which wins our admiration and reflects the greatest credit upon Professor Laurie and all concerned.

The Mammals, 51 in number, are by Mr. Hugh Boyd Watt; the extensive list of Birds, 233 species, by Mr. John Paterson; the Reptiles and Amphibians, 9 species, by Mr. Alfred Brown; the Fishes, 138 species, by Mr. Thomas Scott and Mr. A. Brown.

We mention the Vertebrates in particular because the number of species treated of in each class conveys some idea of the completeness of the work accomplished by the respective authors. It must be mentioned, however, that certain species which have been recorded on doubtful evidence are also included, though they have been omitted from our census.

As to the very extensive portion devoted to the Invertebrates, it is impossible to enter here into details. It is sufficient to state that

the various Orders have been undertaken, among others, by the following well-known specialists:—Messrs. A. A. Dalglish, Wm. Evans, Anderson Fergusson, Percy H. Grimshaw, J. J. F. X. King, Malcolm Laurie, Thomas Scott, etc.

The volume is accompanied by a most excellent large scale Bathy-Orographical map of the Clyde area, and is a work which ought to be in the possession of every one interested in the natural history of Scotland, indeed of the British Isles.

The Life-History of British Serpents and their Local Distribution in the British Isles. By Gerald R. Leighton, M.D. (Edinburgh: William Blackwood and Sons, 1901.)

This neat little volume is devoted to a full and particular account of the life-histories of the three species of snakes found within the British Islands. Herein not only does Dr. Leighton record his own wide experiences as one who has made a special study of British Serpents, but he has ransacked the voluminous literature in search of the interesting and varied information concerning them; and thus we find in his book stores of knowledge not garnered elsewhere. The author, too, has been careful to indicate a number of important points on which further investigations are necessary.

On the question as to whether Adders swallow their young, we are distinctly disappointed to find that Dr. Leighton is content to sit upon the fence. We should certainly have expected him to have taken up a more robust attitude. It is not a mere question of deciding between conflicting evidence. Have we not *evidence* equally good in favour of living toads and frogs having been found enclosed in solid rock? Yet no one with scientific training believes in the reliability of such evidence. We strongly advise all who are credulous on these points to read Dr. Traquair's criticisms contained in a paper entitled "Popular Delusions in Natural History" ("Trans. Edinburgh Field Nat. Club," iii.), wherein, in our opinion, these traditional beliefs are most effectually disposed of.

The second portion of the book is devoted to the details of geographical distribution of the species throughout the counties of Britain; but the author does not appear to have seen any of the series of the "Vertebrate Faunas" devoted to the Scottish areas.

The book is nicely illustrated, is well written, and worthy of the attention of Scottish naturalists.

Insect Life: Souvenirs of a Naturalist. By J.-H. Fabre. Translated from the French by the Author of "Mademoiselle Mori." (London: Macmillan and Co., 1901.)

This little book is, in our opinion, one of the most charming accounts of the habits of insects ever published in the English language. The "Souvenirs Entomologiques," of which seven series have appeared, are well known in their original garb to the working

entomologist as a remarkably interesting record of observations made with an acuteness that has seldom been surpassed, and the translator, editor, and publishers are alike to be congratulated on the production of this first series in our own language and in a form both attractive and easily understood even by the general reader. Few persons will be able to take up this volume without reading it from beginning to end, and a feeling of regret will be experienced at its close, that the remaining series are not yet translated. We trust that the success which we predict for the volume before us will induce the publishers to arrange for the early completion of these fascinating peeps into "Insect Life." P. H. G.

A Treatise on Zoology. Edited by E. Ray Lankester: Part IV. The Platyhelmia, Mesozoa, and Nemertini, by W. Blaxland Benham, D.Sc. (Lond.), M.A. (Oxon.), Professor of Biology in the University of Otago.

This work does not profess to be for the benefit of such as are "of weaker capacity." It aims at giving a systematic exposition of the characters of the classes and orders that are treated of, along with references to the families and chief genera included in them. The various classes are dealt with separately. They are divided into orders, and very short notes are given on sub-orders and families. Then come "further remarks" on the order; and under this head we have brief statements as to bionomics and the structure of the various systems. As the treatise extends to less than 200 pages in all, there is no possibility of full detail with such a plan. The information as to bionomics is particularly scrappy. "The work," Prof. Lankester tells us, "is addressed to the serious student." As matter of fact the present volume, while very admirable in its way, seems to appeal to rather a limited class. It is certainly not a text-book for the average university student, whether of science or medicine; it is too full for the beginner; on the other hand, there is too much comparative anatomy for the ordinary systematist, and perhaps too much systematic zoology for the ordinary comparative anatomist. Nevertheless, the book will reward those for whom it is meant. It is, as might be expected of a treatise edited by Prof. Ray Lankester, full of historical information as to names and discoveries; and there are useful notes on authorities, and lists of literature on the various classes. The exposition of facts is fair and clear; and the figures, a number of which are new, are decidedly useful. The book should prove valuable, especially to teachers and investigators. G. W.

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REPORT ON THE MOVEMENTS AND OCCURRENCE OF BIRDS IN SCOTLAND DURING 1901.

By T. G. Laidlaw, M.B.O.U.

(*Continued from p.* 82.)

Alauda arvensis (Skylark).

Orkney—Noup Head, Feb. 25, at lantern; March 26, at light. Sule Skerry, March 10, one. *Tay*—Bell Rock, Feb. 26, at lantern; March 12-13, on lantern, two killed; April 18, at light. *Outer Hebrides*—Flannans, March 8-9, passing in great flocks; 13th, numbers; 15th, flying round light; Oct. 2, several; Nov. 26, small flock; Dec. 3, about twelve. Monach, Jan. 15, flying round light with Starlings and other birds; March 1, at light; April 25, numbers; Oct. 13-15, many with other birds. Island Glass, Oct. 28, flocks passing. *Argyll and Isles*—Skerryvore, March 13-16, several at light; 23rd, with other small birds at light; Sept. 16, flocks resting on the rock; 23rd, four at lantern; Nov. 7, three. Dhuheartach, Feb. 18-19, great numbers at light, several killed; 27th, three killed; March 13-14, great numbers flying in rays, Thrushes, Blackbirds, etc.; March 16, at light; Aug. 29, great numbers with Pipits, Wheatears, and Wagtails; Sept. 12, large numbers, Wheatears, Meadow Pipits, etc.; Nov. 4-5, great numbers of birds, Fieldfares, Redwings, and Skylarks. *Clyde*—Lamlash, Feb. 24, one killed at light.

Principal movements, March 13-16, Aug. 29, Sept. 12-16, Oct. 13-15, and 28th.

Cypselus apus (Swift).

Shetland—Scousburgh, June 22, a good many. Lerwick, West Hall, June 25, two. *Orkney*—Sule Skerry, July 4, eleven, 8.30 P.M.; July 11, one rested in window all night. *Dee*—Aberdeen, May 9, three; Aug. 18, one. *Tay*—Pitlochry, April 29, one; May 1, one. Perth, May 6. Bell Rock, July 8, one flying round; 10th, four flying W. *Forth*—Duddingston, April 29, one. Morningside, May 5, three. Dean, Canty Bay, Gladhouse, May 6. Kirkliston, Aug. 14. Dalmeny, Sept. 8. *Outer Hebrides*—Flannans, June 28, one. *Argyll and Isles*—Skerryvore, May 22, one, first this year; July 8, four; Aug. 12, one. *Clyde*—Kilbirnie, May 5. *Solway*—Maxwelltown, May 10.

Earliest, April 29, Pitlochry and Edinburgh; latest, Sept. 8, Dalmeny.

Caprimulgus europæus (Nightjar).

Dee—Aberdeen, Aug. 17, one killed. *Tay*—Pitlochry, May 5, one. *Forth*—Tranent, seen every night for about three weeks at end of August and beginning of September. *Clyde*—Lamlash, April 25. *Solway*—Maxwelltown, May 15, first seen. Portpatrick, May 20, pair, first; Sept 19, last.

Earliest, April 25, Lamlash.

Dendrocopus major (Great Spotted Woodpecker).

Sutherland—Braemore, Sept. 26, young bird. *Forth*—E. Lothian, May 15, seen at Presmennon Lake ("Annals," 1901, p. 181). Dalmeny, June 19. Penicuik, June 24, a young bird, still showing down, captured (*op. cit.*, pp. 235-236). *Tweed*—Hawick, May 14, breeds annually in Wells and Minto woods, nest examined. Selkirk, birds seen feeding young in a wood in June (*op. cit.*, pp. 234-235); August first week, an old bird, in moult, captured near West Linton.

Cuculus canorus (Cuckoo).

Shetland—Lerwick, May 18, found dead at Knot. *Orkney*—Noup Head, May 30, first I have heard here. *Moray*—Strathconan, May 2, comparatively scarce this year. *Dee*—Aberdeen, May 5, one. *Tay*—Blair Atholl, April 29. Auchinblae, May 3, heard. Pitlochry, May 4, one, none previously. *Forth*—Tulliallan, April 27, heard. Dreghorn, April 30. Pencaitland, April 30. Collessie, May 2, N. Berwick and Gladhouse, May 6. Isle of May, May 28, one. *Tweed*—Broughton and Halmyre, April 28. Cramilt, April 30. Ruberslaw, May 1. *West Ross*—Inverbroom, May 8, first heard. *Outer Hebrides*—Barra, May 3. *Argyll and Isles*—April 27, heard at Earraid. Sound of Mull, April 27, heard.

Clyde — Lendalfoot, April 19. Carmichael, May 2. Lamlash, April 29. *Solway*—April 20-21, reported from Moffat to Ballantrae.

Earliest, April 19, Lendalfoot.

Asio otus (Long-eared Owl).

Shetland—Scousburgh, Jan. 1, one.

Asio accipitrinus (Short-eared Owl).

Argyll and Isles—Skerryvore, March 26, at lantern, rare occurrence. Tiree, Nov. 15, one; Dec. 16, two.

Archibuteo lagopus (Rough-legged Buzzard).

Sutherland and Caithness—Thurso, Jan. 29, a ♀ obtained at Shurrery, Sandside.

Milvus migrans (Black Kite).

Dee—April 16, a ♂ shot near Aberdeen ("Annals," 1901, p. 133).

Pernis apivorus (Honey Buzzard).

Solway—Dumfries, Jan. 17, one captured at Waterside Farm, lived for three weeks ("Annals," 1901, pp. 80-81).

Falco candicans (Greenland Falcon).

Sutherland—Feb. 6, a ♀, Dunbeath. *Moray*—April, beginning of, an immature bird killed in Kingussie district ("Annals," 1901, p. 234).

Falco tinnunculus (Kestrel).

Orkney—Sule Skerry, Feb. 20, one; Aug. 9, one. *Argyll and Isles*—Dhuheartach, April 18, one.

Sula bassana (Gannet).

Forth—North Berwick, Feb. 3, returned to Bass. *Clyde*—Lamlash, March 4, one, first seen. *Solway*—Portpatrick, April 14, one killed on the wires.

Anser cinereus (Grey-lag Goose).

Shetland—Scousburgh, Oct. 19, two on Spiggie. *Sutherland, etc.*—April 10, young ♂ from Scotscalder. *Outer Hebrides*—Flannans, Sept. 14, six. Uist, numerous in December.

Anser brachyrhynchus (Pink-footed Goose).

Forth—Aberlady, Oct. 6, heard in Bay at night; 8th, forty-three seen; 12th, fifty.

Anser albifrons (White-fronted Goose).

Argyll and Isles—Tiree, April 26, numerous all winter, have now left; Oct. 8, have arrived.

Bernicla leucopsis (Barnacle Goose).

Shetland—Scousburgh, Oct. 17, twenty-five on Spiggie. *Orkney*—Sule Skerry, April 26, a flock of fifty, flew due north. *Tay*—Pitlochry, May 2, a flock of sixty or seventy, flying up the valley of the Tummel ("Annals," 1901, p. 182). *Forth*—Aberlady, Oct. 24, twenty-four seen in Bay. *Outer Hebrides*—Flannans, March 20 and 24, flock rested on Island; April 20, in hundreds feeding on Island; April 30, nineteen. Barra, Eoligary, April 29, left. *Argyll and Isles*—Tiree, May 1, flock.

Bernicla brenta (Brent Goose).

Shetland—Scousburgh, Oct. 19, one on Spiggie. *Forth*—Aberlady, Sept. 29, one in Bay. *Outer Hebrides*—Barra, April, 2nd week, left. *Argyll and Isles*—Tiree, Jan. 9, single bird.

Cygnus musicus (Whooper Swan).

Shetland—North Unst, April 12, three going north-west; Sept. 7, large flock heard passing during night. Scousburgh, Oct. 28 and 29, several on Spiggie; Nov. 18, two. *Sutherland*—Thurso, Jan. 1, on Lochend, remained for a week. *Forth*—North Berwick, Jan. 1, about thirty flying west; Nov. 7, flock of seven. *Argyll and Isles*—Tiree, March 7, numerous all winter, have now left; Nov. 16, large flock, Loch Biogan.

Cygnus bewicki (Bewick's Swan).

Shetland—Scousburgh, Jan. 12, on Spiggie. *Argyll and Isles*—Tiree, March 7, numerous all winter, have left; Nov. 16, a few, Loch Biogan.

Tadorna cornuta (Sheld Duck).

Orkney—N. Ronaldshay, April 27, two. *Forth*—Dalmeny, Feb. 27, eighteen in Longgreen Bay. *Clyde*—Lamlash, April 8, a pair, first, breeds.

SPATULA CLYPEATA (Shoveller).

Argyll and Isles—Tiree, May 7, two pairs. Island House Loch, Nov. 9, a ♂.

DAFILA ACUTA (Pintail).

Shetland—Scousburgh, June 28, a ♂ for some weeks on Spiggie. *Orkney*—N. Ronaldshay, April 20, two. *Sutherland, etc.*—Aug. 1, an adult ♀ in full moult shot on Loch Heilan ("Annals," 1901, p. 236). *Tweed*—Near Hawick, May 17, nest with seven eggs (five hatched out). *Clyde*—May 11-18; a pair, Little Loch, Mearns.

MARECA PENELOPE (Wigeon).

Tay—Auchinblae, March 3, a pair, Glensaugh Loch. *Outer Hebrides*—Monach, April 10, last seen; Nov. 13, first. *Argyll and Isles*—Tiree, Oct. 15, arriving in large flocks. *Clyde*—Oct. 19, flocks, Ardmore Point.

FULIGULA FERINA (Pochard).

Dee—Peterhead, April 8, numerous. *Argyll and Isles*—Tiree, Nov. 8, flock. *Clyde*—Gartcosh, April 5, one, Lochend. *Solway*—Breeds annually in Mochrum parish ("Annals," 1901, p. 117).

FULIGULA MARILA (Scaup).

Forth—Aberlady, Sept. 28, plentiful.

CLANGULA GLAUCION (Golden-eye).

Forth—Aberlady, Oct. 12, three. *Argyll and Isles*—Tiree, Nov. 14, several. *Clyde*—Balgray Dam, Oct. 6, four ♂'s.

HARELDA GLACIALIS (Long-tailed Duck).

Orkney—Sule Skerry, Oct. 19, one, immature. *Dee*—Peterhead, April 8, numerous. *Tay*—Bell Rock, March 26, have now left. *Forth*—Aberlady, Oct. 12, three shot, very plentiful. *Outer Hebrides*—Barra, Eoligary, May, first week, left.

SOMATERIA MOLLISSIMA (Eider Duck).

Argyll and Isles—Skerryvore, Sept. 16, a ♂; Oct. 17, a flock, returned after breeding. Dhuheartach, Sept. 23, flocks, first.

ŒDEMIA NIGRA (Common Scoter).

Sutherland—Thurso, April, a ♂ on Loch Ruard, June 21, a ♀ near Spittal; Aug. 22, a ♀ from Loch Dhu.

ŒDEMIA FUSCA (Velvet Scoter).

Forth—Aberlady, Nov. 9, very common.

MERGUS ALBELLUS (Smew).

Shetland—Scousburgh, Feb. 14, one shot.

COLUMBA PALUMBUS (Ring Dove).

Shetland—Scousburgh, Jan. 5, one. *Outer Hebrides*—Barra, April 28, two.

COLUMBA ŒNAS (Stock Dove).

Sutherland and Caithness—Thurso, Dec. 4, a ♀ shot near Castletown, first record for the county ("Annals," 1902, p. 53). *Moray*—Very abundant as a nesting species in river gorges of Strathglass. *Forth*—North Berwick, Feb. 24, flock of about a hundred flying north-west. *Clyde*—Avondale, May 22, pair, nest with two eggs.

TURTUR COMMUNIS (Turtle Dove).

Solway—Oct. 12, killed near Gretna, now in Edinburgh Museum.

COTURNIX COMMUNIS (Quail).

Forth—E. Lothian, May 30, heard calling at Macmerry.

CREX PRATENSIS (Corn Crake).

Orkney—N. Ronaldshay, May 20, one. Noup Head, May 9, one, first this year. Sule Skerry, May 13, first, does not remain here; Sept. 25, one. *Dee*—Aberdeen, May 9, one; Sept. 16, one killed. *Tay*—Auchinblae, April 28, killed on telegraph. Pitlochry, May 6, none heard before this date. *Forth*—Tranent, April 23. Dalmeny, April 28. Kirkliston, April 29. Dreghorn, April 30. *Tweed*—Halmyre, April 25. *West Ross*—Inverbroom, May 9, first. *Outer Hebrides*—Barra, Eoligary, April 28, arrived. Monach, May 30, four in garden, stayed all summer. *Argyll and Isles*—Sound of Mull, May 5, heard. Tiree, May 8, Crosspool. *Clyde*—Maryhill, March 23 (Wm. Goodwin). Dippen, Arran, April 10. Lendalfoot, April 19. *Solway*—Portpatrick, April 25, one. Dumfries, April 26, reported; May 1, very plentiful. Lochmaben, Sept. 25, killed on telegraph wire. Portpatrick, several shot when Partridge-shooting in October.

Earliest, March 23, Maryhill. [Probably wintered.]

PORZANA MARUETTA (Spotted Crake).

Shetland—Scousburgh, Sept. 25, shot in Spiggie Marsh. *Forth*—Aug. 15, one shot near Dunbar.

PORZANA CAROLINA (Carolina Crake).

Argyll and Isles—Tiree, Oct. 25, a young ♂ obtained in Ronnach Bog ("Annals," 1902, pp. 9, 10).

RALLUS AQUATICUS (Water Rail).

Orkney—Sule Skerry, Nov. 12, one. *Forth*—Isle of May, Oct. 15, one. *Tweed*—Hawick, April 25, nest with eggs.

CHARADRIUS PLUVIALIS (Golden Plover).

Shetland—North Unst, Oct. 16, immense flocks on hill. *Orkney*—N. Ronaldshay, July 6, beginning to flock. Sule Skerry, April 19-20, a few; May 3, several; Nov. 30, a few. *Tay*—Auchinblae, March 17, a flock. *Forth*—Isle of May, Nov. 3, circling round light. *Tweed*—Cramilt, March 31, three. Halmyre, April 10, have arrived. *Outer Hebrides*—Flannans, April 22, one; May 1, one; Sept. 14, three shot. Monach, Jan. 26, flocks. *Argyll and Isles*—Tiree, April 18, very large flocks. *Solway*—April 28, many on the moors in little flocks.

SQUATAROLA HELVETICA (Grey Plover).

Shetland—Dunrossness, Sept. 27, one shot, Virkie Voe. *Forth*—Aberlady, Sept. 5, five; 28th, numerous. *Outer Hebrides*—Flannans, April 29, one; May 5, one. *Clyde*—Balgray Dam, Sept. 14-18, one.

VANELLUS VULGARIS (Lapwing).

Shetland—North Unst, March 3, a flock. *Orkney*—N. Ronaldshay, March 5, a flock of twenty. Noup Head, March 13, three, first this year. Sule Skerry, Feb. 26, two; March 3, a flock of thirty to forty, stayed a week; May 28, four all day; Sept. 25, six. *Tay*—Auchinblae, Feb. 25, arrived at breeding grounds, many perished during storm, March 26-30. Bell Rock, March 12, flying in rays; April 6, at light; Oct. 16, on rock at low water. *Forth*—Isle of May, Nov. 3, circling round light. North Berwick, Feb. 26 and 27 and March 2, straggling flocks flying W. all day, similar movements noticed during last two or three years. *Outer Hebrides*—Flannans, March 6-22, several; April 3, one; May 12, one. *Argyll and Isles*—Skerryvore, April 2, one on rock, rare. Dhuheartach, Sept. 13, one. *Clyde*—Carmichael, Feb. 16, return. Lamlash, Aug. 6, flocks. *Solway*—Dumfries, Sept. 26, 8.30 A.M., scores flying S., very high altitude.

STREPSILAS INTERPRES (Turnstone).

Orkney—Sule Skerry, April 16, last seen, about thirty to forty resident every winter; June 16, five, a few in summer plumage observed at intervals all through the summer, left in a southerly direction on July 4; July 30, a flock in immature or winter plumage arrived. Stromness, Aug. 29, eight. *Tay*—Bell Rock, April 18, one on rocks; Aug. 23, on rock at low water. *Argyll and Isles*—Skerryvore, March 26, left for breeding; Sept. 10, returned. Dhu-heartach, Aug. 1, flocks on rock, first appearance. *Clyde*—Cardross, Aug. 5.

(*To be continued.*)

ON THE AVIFAUNA OF THE OUTER HEBRIDES, 1888-1902.

By J. A. HARVIE-BROWN.

(*Continued from p.* 91.)

SINCE the introductory part of this paper appeared, I have received a few more notes from Mr. Abel Chapman. As these notes are so far descriptive of the general aspects of the Outer Hebrides in the autumn months of the year, viz. from August to October (1900), I think they may serve as a short introduction to this second part of my paper.

Mr. Chapman says: "The moors in August are almost more birdless than those of Sutherland or the Borders. The chief characteristic species noticed on the heather in August were Titlarks, Twites, Wheatears, Stonechats (few), Hoodies, and Short-eared Owls. About the crofters' corn were Skylarks, Buntings, etc. The only Anatidæ seen in August were Mallard, Teal, Merganser, and Greylag Geese; Eiders on the salt water; no Shieldducks seen. A few Black Guillemots (young) appeared on the sea-lochs during September. Otherwise we noticed nothing beyond the most ordinary shore-birds, such as Herons, Curlews, Redshanks, Ring-dotterels, and the like. At the end of September there was a conspicuous flocking or assembling of small birds, remarked specially upon the 29th of that month—chiefly Larks, Titlarks, and Twites; but another

migration—much more extensive—on October 10. On the latter date also saw two Redwings, both very much exhausted."

Since Mr. Eagle Clarke and I have received schedules from the new lighthouse at the Flannan Isles, another link in the chains of migrations of many species has been found, and I think this is a good place to enter a separate list of birds now recorded from these western isles. I give the list from no less than seven full schedules sent in in 1902 —our best return—and from some of the earlier schedules.

Birds hitherto observed at the Flannan Isles (to date of April 1902).

Gold Crest—March 8, 1901. Redwing—April 19, 1901 ; many, and stayed for ten days. Fieldfare — Occurs in numbers on migration as far west as the Flannans. Blackbirds — Also occur in numbers on migration at these isles. Wheatears and Stonechats are both entered as occurring. White Wagtail — These are reported as most common in autumn, and fewer in spring —, and Pied Wagtail—One only is recorded from Flannan Isles in April 1901, but the species is recorded as "numerous in autumn" (Sept. 22, 1901). Meadow Pipit, Swallow, Martin, Greenfinch—A large flock, Oct. 30, 1901. Chaffinch — Very numerous during autumn migration. Brambling—Eight or nine seen, Nov. 15, 1901. This appears to be the first record I have of the Brambling in the Outer Hebrides. Snow-bunting—Spring and autumn ; in thousands by October. Starling, Jackdaw—One recorded, Feb. 22, 1901. Rook—A few seen in spring, and one killed. (Large flocks are reported from Sule Skerry, Orkney. It would be interesting to know whence these were seen to arrive, and in which direction they departed.) Swift—One recorded, June 6, 1900. Skylark—Great flocks seen to pass on migration in spring. Merlin—One, sent for identification, Sept. 19, 1900. Greylag Goose—Six seen upon the Lighthouse Island on Sept. 6, 1901. Turtle-dove—One recorded in June 1901. Golden Plover — A few pass in spring,

and flocks in autumn. GREY PLOVER—(Query, Knot). LAPWING, OYSTERCATCHER, WOODCOCK—In winter two were killed, and a leg and wing sent for identification. JACK-SNIPE—Four recorded in Nov. 1901, and one wing sent. CURLEW, WHIMBREL, ARCTIC TERN, RAZOR-BILLS —Arrived in thousands on Feb. 28, 1901, and also GUILLEMOTS; but PUFFINS are not given as appearing in force before April 18, 1901, though by April 22 the island was literally covered with them, and it would be impossible to arrive at any idea of their numbers. FULMARS—Appeared in numbers at Flannan Isles on April 7, 1901, and several on 21st passing. MANX SHEARWATERS —In numbers on Sept. 16, 1901. STORM PETRELS—On May 4, 1901, two were killed. In July, plentiful on 4th and 20th; and in numbers on Sept. 16, 1901.

I have also been enabled to incorporate the observations of the late Dr. C. Gordon, who was long resident in South Uist, and who, possessing a copy of MacGillivray's "British Birds," added his notes on the margins, under the different species. By the courtesy of my friend — Mr. W. L. MacGillivray—I have been enabled to consult these notes, in vols. ii., iv., and v.—*the only 3 vols. of the set*, which came into Mr. W. L. MacGillivray's hands.

[MISTLETOE THRUSH (*Turdus viscivorus*), p. 44.[1]—I have in vain tried to obtain a single record of the occurrence of the Mistletoe Thrush anywhere in the Outer Hebrides, either through correspondence or in the Migration Schedules. This species, therefore, must still remain in square brackets.]

[Since the above was written, I heard of the identification of two Mistletoe Thrushes seen within the Castle grounds at Stornoway. Two are reported as seen there on April 29, 1902, by Dr. Mackenzie of Stornoway, and stated to be the first ever seen there. I was within the policy walls myself upon May 1, 1902, but could see nothing of them, and Dr. Mackenzie had looked for them again in vain. They could only be passing vagrants. I will not yet remove the brackets.]

REDWING (*Turdus iliacus*), p. 45. FIELDFARE (*Turdus pilaris*), p. 46.—These Thrushes may now be classed as regular, and probably increasing during migration. But, although seen during

[1] The figures after each species mentioned indicate the pages in our volume on the "Fauna of the Outer Hebrides."

some seasons in great numbers, as in 1887, few or none may be seen in others at the southern stations, as in 1889. The Migration Schedules, in such cases, alone can give any idea of migration past these isles; and now we find Redwings migrating past Flannan Isles.

Blackbird (*Turdus merula*), p. 46.—The Blackbird is now reported as nesting in Barra, first in 1894, to have then probably wintered there, and to have increased and bred in some numbers again in 1895 ("Ann. Scot. Nat. Hist." 1896, p. 24). Previous to this, it had been ascertained to be a very regular passing migrant in autumn throughout the South Isles of Barra; but at a still earlier date it was not found in summer anywhere south of the Sound of Harris, until, after some years, it came—to stay—in North Uist. It now appears in apparently increasing numbers on migration, and is seen in larger "rushes" in autumn. This remark applies both to Barra and to Mingulay—in fact to most, if not all, of these South Isles of Barra; and in the north, in the Flannan Isles. With regard to the autumn migration, Mr. M'Elfrish tells me they come with "striking regularity"; so much so that Sir Wm. Smythe and I always know, that whenever we see a Blackbird, we expect to find Woodcock. Stoddart informed Mr. M'Elfrish that a pair bred at Balelone last summer. Very common at Stornoway, as seen by myself on May 1, 1902.

Ring-ouzel (*Turdus torquatus*), p. 47.—On April 8, 1897, one was identified by Dr. M'Rury. This is the first on record anywhere to the south of the Sound of Harris ("Ann. Scot. Nat. Hist." 1898, p. 76). I feel inclined to give up my record of this species as *heard* by me in Harris, though I can hardly think I could be mistaken in the voice of a bird I know so well in Sutherlandshire and elsewhere. But it does not appear in any of our schedules farther west than Sule Skerry (Orkney).

Dipper (*Cinclus aquaticus*), p. 47.—The Dipper is now considered quite a common species in Lewis and Barra by Mr. C. V. A. Peel. Possibly some slight extension to the southwards of this species may be indicated in the record of its first appearances to the south of the Long Island and Sound of Harris, as related by Dr. M'Rury and Sheriff Webster of Lochmaddy in 1892 ("Ann. Scot. Nat. Hist." 1892, p. 135). Since then, Dr. M'Rury also records a Dipper which both he and Mr. W. L. MacGillivray saw in Barra in January 1894 ("Ann. Scot. Nat. Hist." 1894, p. 113); and later, Mr. MacGillivray writes to me that "A Dipper was shot in October of that year (1894). I have seen one upon a loch within three miles of Eoligary almost every year since, but not breeding as yet."

Whinchat (*Saxicola rubetra*), p. 48.—This bird is advancing southwards, at least we now have some records from Barra. Dr. M'Rury saw two hens, the first he had seen anywhere in the Outer Hebrides, on June 16, 1892. These were passing migrants. Again, in 1893, a pair were found which he believed nested ("Ann. Scot. Nat. Hist."). At last a nest was found by Mr. Proud of Bishop-Auckland, as related by Dr. M'Rury, and several broods were seen by the latter gentleman himself in the same year, viz. 1895 ("Ann. Scot. Nat. Hist." 1896, p. 24).

Stonechat (*Saxicola rubicola*), p. 49.—I am not able to add much information as regards this species in the Outer Hebrides. Mr. Alfred Chapman mentions seeing one specimen a little to the west of Lochmaddy. Mr. Abel Chapman also records that he saw what he took to be a brood in August, just below Ben Langass, in North Uist, but, he adds, "they were not seen later." Both "Wheatears" and "Stonechats" are entered in the Flannan Isles returned schedules.

Redstart (*Ruticilla phœnicurus*), p. 49.—Mr. Finlayson of Mingulay informed Dr. M'Rury that he had once met with this bird on the island, namely on August 6, 1889. Another is recorded at Barra Head on May 15 ("Ann. Scot. Nat. Hist." 1894, p. 153).

Blue-throated Warbler (*Cyanecula suecica*), p. 49.—This is an addition to the Fauna of the Outer Hebrides. On a schedule from the late Mr. Agnew from the Monach Isles, dated October 11, 1888, occurs the item: "1 Blue-throat, 2 P.M., W. strong, cloudy"; and the remark—"Another rarity has turned up here in the Blue-throat. It must have got into the company of the Redstarts we had last week. During all last week it was blowing a gale from the north and north-east, with snow and hail showers." (Mr. Agnew had previously known the species on the Isle of May.) Then upon March 28, 1889, *i.e.* the following spring, I find another chronicled by Mr. Agnew from the same locality, thus: "1 Blue-throat Warbler, 1 P.M., S.W., light, fog."

Redbreast (*Erythacus rubecula*), p. 49.—In 1892 Dr. M'Rury makes first mention of about half-a-dozen pairs as nesting in Barra, and remaining all winter; and again as breeding and increasing, since trees have been planted there.

Whitethroat (*Sylvia cinerea*), p. 50.—Records (till 1900) of the species as only a passing migrant, but a pair was seen in Dr. M'Rury's garden on May 13, 1892 ("Ann. Scot. Nat. Hist." 1892, p. 199); and a pair again seen in 1893. In 1894 one was again seen in Barra on May 5, 1894 ("Ann. Scot. Nat. Hist." 1894, p. 153). And since then Mr. W. L. MacGillivray tells me one was shot in June 1897, and a pair nested in the garden at Eoligary last year (1900), but not this year (1901).

Lesser Whitethroat (*Sylvia curruca*), p. 50.—This has hitherto been bracketed for the reasons given in "Fauna of the Outer Hebrides," but the brackets now come to be removed. Mr. MacGillivray records a "Lesser Whitethroat," shot in October 1899, and presented to the Edinburgh Museum, obtained in Barra ("Ann. Scot. Nat. Hist." 1899, p. 109).

Blackcap (*Sylvia atricapilla*), p. 50.—Dr. M'Rury, again, by his indefatigable observations in Barra, is able to give us a record of the Blackcap there—the first he had seen anywhere in the Outer Hebrides—a single female bird, on October 13, 1893 ("Ann. Scot. Nat. Hist." 1894, pp. 56 and 142). Another is referred to in "Ann. Scot. Nat. Hist." 1893, p. 153, as identified by Mr. Edgar at Barra on October 13—"the first seen *here*."

Garden Warbler (*Sylvia hortensis*), p. 51.—An addition to the Birds of the Outer Hebrides, and the brackets may be removed. One is recorded by Dr. M'Rury ("Ann. Scot. Nat. Hist." 1896, p. 22). It was got on November 25, 1895, in Barra.

Barred Warbler (*Sylvia nisoria*), p. 51.—This species is an addition to the fauna of the Outer Hebrides, the first in Barra, and the third for Scotland. All the Scottish examples have been obtained on the west coasts or islands. It was recorded by Mr. W. A. MacGillivray and verified by Mr. Eagle Clarke ("Ann. Scot. Nat. Hist." 1901, p. 115).

Golden-crested Wren (*Regulus cristatus*), p. 51.—First recorded from Barra by Dr. M'Rury, April 8, 1897; but of course these birds have often occurred at the lighthouses, and appear in the schedules throughout the range, and as far west as Flannan Isles.

Chiffchaff (*Phylloscopus rufus*), p. 52.—This has hitherto been bracketed owing to reasons given in "Fauna of the Outer Hebrides," but the brackets may now be removed. "Chiffchaffs were shot in Barra in October 1889, and Mr. W. L. MacGillivray gave one of a pair to the Edinburgh Museum.

Willow Wren (*Phylloscopus trochilus*), p. 53.—The advance of the species to the southward in the Outer Hebrides is shown by Dr. M'Rury's notes. The MacGillivrays had a pair nesting in their garden at Eoligary for several years up to about 1894, but they did not return in that year. However, numbers were seen in April and May, 1893 and 1894. Considerable planting had been undertaken in Barra, and this increase has no doubt been greatly due to that fact, and to the greater attractions thereby afforded to such wood-loving birds, which pass either during autumn, or on their return journeys along the lines of flight, or are both autumn and spring migrants.

[Wood Warbler (*Phylloscopus sibilatrix*), p. 53.—Hitherto we have bracketed this species, but with the remark in a footnote that an extension might take place at any time from the increasing northward range on the mainland of Scotland. I am now able to add a little further remark to its progressive history in the "Fauna of the Outer Hebrides" by the record in Mr. Peel's book already quoted. In reply to my further inquiry, he writes me that he "saw Wood Wrens in North Uist opposite the island of Vallay in 1898." He adds: "I never had a shot at them, although I tried. As far as I remember, I saw three altogether, two in one day." Since I worked in the above notes by Mr. Peel, I have been most liberally permitted to peruse and make use of the diary of the late Mr. Alfred Chapman, who spent part of the summer of 1883 collecting in the Outer Hebrides. I have to thank his brother, Mr. Abel Chapman, for this privilege. Mr. Alfred Chapman writes: "On the top of Benlee (North Uist) I recognised the lovely song of a bird I was very familiar with, and soon discovered him—the Wood Warbler (*Sylvia sibilatrix*). That was indeed a strange place for such a bird, and I believe this will prove to be its first occurrence so far north in the Scottish Highlands." He goes on to say: "Gray mentions Aberdeen as its northern limit: Yarrell quotes from him; but I think this exceeds both of these. It was evidently breeding in the heather, as, with quivering wings, it was *hovering* about, uttering its twittering cry and very shrill melodious whistle. I was starting to look for its nest, when I heard the cry of a Merlin, and this drew away my attention." Notwithstanding all the above evidence, I am afraid we must still confine the Wood Warbler inside square brackets.]

Subalpine Warbler (*Sylvia subalpina*).—Mr. Steele-Elliott found a specimen of this southern species in the Manse garden of St. Kilda on June 13, 1894. A great gale of *south-west (!)* wind had blown across the island on the previous day (June 12). This is the first record not only for the Outer Hebrides but also for the British Isles. It was seen to busily exert itself in searching a row of young peas, and a parsnip in seed, which apparently attracted a large number of insects. For a full account of this interesting find, see Mr. Steele-Elliott's article ("Zool." 1895, p. 281).

Sedge Warbler (*Acrocephalus phragmitis*), p. 54.—An addition to the Fauna of the Outer Hebrides is a Sedge Warbler, seen by Dr. M'Rury at Eoligary, Barra, in June 1893. In speaking of these extensions of summers visitants or migrants, it seems to me, we ought to pay attention to those which may more likely breed in the future, where changes in the nature of surrounding conditions are in progress, as, for instance, at Eoligary, and also at any localities south of the Long Island and Sound of Harris. It is in points such as these where the real interest comes in in close chronological recording.

Hedge Accentor (*Accentor modularis*), p. 54.—Several pairs were seen in Barra, and two nests were found there in 1892 by Dr. M'Rury, who adds: "I never saw the bird in Uist" ("Ann. Scot. Nat. Hist." 1892, p. 198); but "Mr. J. Finlayson once described a bird to me which could scarcely have been anything other than a Hedge Sparrow." And "a pair at Barra Head" ("Ann. Scot. Nat. Hist.," 1894, p. 212) is scheduled.

The St. Kilda Wren (*Troglodytes hirtensis*), p. 56.—We were perhaps somewhat premature in our remarks about this race of Wren in our volume "Fauna of the Outer Hebrides" (*vide* pp. 56-57), because, as suggested, on "the more remote isles of the group it might survive, as these are less accessible, and not so frequently visited." Since then I have myself heard its song close to the village on the main island, in 1896, and my friend, the late Mr. John Young, obtained eggs from a nest close to the dwelling-house in which he stayed. There is no great need to exaggerate the case of its survival or extinction *yet*, but there is no doubt it ought to receive some attention for its preservation in the near future. Indeed, it is not the only species, or geographical race, which deserves protection. In 1895 Mr. Mackenzie, the factor, described: "the Wren was nearly extinct." Let us hope he will, before it is too late, make some endeavour to protect the remainder from the rapaciousness of collectors, who are the first deserving of blame. It is none the less an interesting bird, because it is not universally admitted to be anything more than a geographical race.

Wren (*Troglodytes parvulus*), p. 56.—There is little doubt that the Wrens of the Outer Hebrides are darker in colour than those of the mainland, and may be held as showing an intermediate phase between the St. Kilda bird and the mainland one. I have noticed this several times, and Mr. Chas. V. A. Peel, who has spent many seasons in the Outer Hebrides, and has always paid attention to the birds he met with when shooting in Lewis, North Uist, and Benbecula, also says: "This bird—the Wren—is much darker than the Wren found on the mainland." Here is an opportunity for some investigator who likes to make out "new species" to minutely describe and claim it!

White Wagtail (*Motacilla alba*), p. 57.—This may now be claimed as a regular spring and autumn migrant. Numbers are seen on the island of Barra almost every season. Thus we find migrants appearing in May, in the usually smaller numbers of the spring movements, and the following autumn—August—numbers seen all over the island. Almost certainly all the Wagtails referred to in the schedules sent me by the late Mr. Agnew from Monach Isles were White Wagtails. Under date of April 26, 1888, is an entry: "2 Wagtails, 1 P.M.," and the accompanying note: "These

are the same kind of Wagtails as I reported last year, and must be what are called the White Wagtail. They are of a very light grey colour, all except the breast and top of the head." And in later schedules he refers usually to "the same kind as reported before." At Flannan Isles one "Pied Wagtail" is recorded in April, and the species is stated to be numerous in autumn. We prefer to enter that record here.

Gray Wagtail (*Motacilla melanope*), p. 57.—The first specimen for Barra was obtained on October 6, 1893, by Dr. M'Rury ("Ann. Scot. Nat. Hist." vol. iii. p. 142). And a second, also for Barra, has been recorded.

Pied Wagtail (*Motacilla lugubris*), p. 57. It appears extremely doubtful whether the earlier records of this western form of Wagtail are not all, or almost all, referable to the Icelandic and European form last spoken of. The first record given was upon the authority of one whom all ornithologists have looked upon as very correct, viz. by the late Professor MacGillivray, who speaks of it as arriving in the Outer Hebrides as early as the middle of March. This was in 1837; but our accounts of it since then are very meagre indeed. John MacGillivray does not include it, and other accounts may or may not be correct. In recent years we have obtained a few authentic identifications, and we accept Barrington's at North Rona (or Mr. William's), and possibly Sir E. Milner's. What I consider ought to be accepted as the first really authentic record in the Outer Hebrides is that by Dr. M'Rury on January 14, 1894; and he adds: "although it probably visits us on migration along with the White Wagtail." Since then Mr. W. L. MacGillivray observed a single bird in Barra, and gives us the particulars in the following terms: "I saw the Pied Wagtail in Barra for the first time on November 15, 1900. It was a single bird, and I have not seen one since."

Great Grey Shrike (*Lanius excubitor*), p. 59.—We now have the first notice of this bird as a visitor to the Outer Hebrides. It now becomes an addition to the Fauna. One was shot in April 1900 by Mr. W. L. MacGillivray in Barra.

Waxwing (*Ampelis garrula*), p. 59.—This bird now may be added to the Fauna of the Outer Hebrides. Mr. D. Mackenzie of Stornoway writes me under date of November 19, 1901, as follows: "I am sending you by parcel-post a specimen of what I take to be the Bohemian Waxwing, which was killed in a garden in town by a boy with a catapult." Mr. Mackenzie goes on to say: "A specimen was killed 25 years, or more, ago, by the then keeper, Munro, at The Lews Castle." This specimen is recorded in "Ann. Scot. Nat. Hist." 1902, p. 52.

Red-breasted Flycatcher (*Muscicapa parva*), p. 59.—This is an addition to the Fauna of the Outer Hebrides. Mr. William Tulloch records one which he caught and kept alive for two days amongst flowers in the windows of the lighthouse on the Monach Isles. He saw it first on October 22, 1893, at 10.30 A.M., but did not catch it till a few days after. It was finally caught in a store on the island. The specimen was sent to Mr. Eagle Clarke for identification, along with schedules, a day or two after ("Ann. Scot. Nat. Hist." 1894, p. 2).

Swallow (*Hirundo rustica*), p. 60.—This is recorded as a nesting species for the first time, in Barra, in June 1896 by Dr. M'Rury ("Ann. Scot. Nat. Hist." 1897, p. 75).

Siskin (*Chrysomitris spinus*), p. 61.—An addition to the Fauna of the Outer Hebrides. Two were seen in Dr. M'Rury's garden on October 29, 1897, and for the space of a month about a dozen remained, and were often seen by Dr. M'Rury and Mr. W. L. MacGillivray, in various parts of the island of Barra. None have, however, been seen since. The species comes, however, to be added to the Fauna of the Outer Hebrides.

Goldfinch (*Carduelis elegans*), p. 61.—Mr. Finlayson, Mingulay, once observed an individual of this species in that island, and informed Dr. M'Rury of the fact ("Ann. Scot. Nat. Hist." 1896, p. 23), but Mr. W. L. MacGillivray adds the negative evidence that he never saw one in Barra! On the other hand, Sir J. Campbell Orde records one seen by his son Arthur (now Sir Arthur), in North Uist on May 21, 1893, and there was probably another in its company ("Ann. Scot. Nat. Hist." 1893, p. 592); and Sir Arthur, in a later communication, includes one as also having been seen in the same place in 1892.

Common Sparrow (*Passer domesticus*), p. 61.—Three males and two females arrived in Barra and took possession of a roosting-place, (driving out the Tree Sparrows), and occupied it. This was on November 24, 1893. In March 1894 another female House Sparrow arrived, *but none remained*, all leaving together, early in May. This seems an interesting note; and no doubt they found the summer conditions not quite to their satisfaction in some particular direction. Mr. M'Elfrish writes as follows: "I have frequently seen the common House Sparrow in the village of Castlebay, and at Tarbert, Harris, but nowhere else in the islands."

Tree Sparrow (*Passer montanus*), p. 62.—This interesting species is reported as "now very numerous in the island of Barra, especially at Eoligary, where it has been at least forty or fifty years. ("Ann. Scot. Nat. Hist." 1892, p. 195). (The allied species appears to be of only very recent advent). The late Mr. Agnew, lighthouse-

keeper, also reports *two* at Monach on April 7, 1888, and expressed himself as "very much astonished at their appearing there."

Chaffinch (*Fringilla cœlebs*), p. 62.—The Chaffinch, as yet, has only been recorded as a migrant in Barra (*auct.* Dr. M'Rury, 1894). Sir J. Campbell Orde also adds a locality of its appearances, viz. North Uist ("Ann. Scot. Nat. Hist." 1893, p. 527). A distinct increase of this bird is observable around Stornoway, as I am informed by Mr. D. Mackenzie.

Brambling (*Fringilla montifringilla*), p. 62.—Added to the Fauna of the Outer Hebrides. More or less of these birds are reported from Flannan Isles on November 15, 1901. This appears to be our first actual record so far west, and the first obtained definitely from the Outer Hebrides, unless we accept the general statement of the late Dr. J. D. Fergusson ("Fauna of the Outer Hebrides," p. 247).

Common Linnet (*Linota linaria*), p. 63.—This has hitherto been bracketed in "Fauna of the Outer Hebrides." Mr. W. L. MacGillivray records "a pair of Linnets shot in May 1894," *i.e.* since Dr. M'Rury left there, and adds: "These birds have not been seen since in the island."

Lesser Redpoll (*Linota rufescens*), p. 63.—Added to the birds of Barra by Dr. M'Rury, on the authority of Mr. Murdo MacGillivray, and by Mr. W. L. MacGillivray ("Ann. Scot. Nat. Hist." 1896, p. 22). Messrs. MacGillivray presented a nest and eggs of this species, taken in Barra, to the Edinburgh Museum.

Greenland Redpoll (*Linota rostrata*).—This is an addition to the Fauna of the Outer Hebrides. Three specimens have been obtained in Barra, and their discovery has been due to the observant ability of Mr. W. L. MacGillivray, who forwarded the specimens to Mr. Eagle Clarke, who put their identity *beyond a doubt* (*vide* "Ann. Scot. Nat. Hist." 1891 (July), p. 131). One was a male, obtained on October 8, 1896; one, sex undecided, November 10, 1898; and one on October 30, 1900 ("Ann. Scot. Nat. Hist." 1901, pp. 131-133), and Mr. MacGillivray informs me that he has seen one or two here nearly every autumn or early winter since. Two were obtained in September 1901 ("Ann. Scot. Nat. Hist." 1902, p. 118).

Bullfinch (*Pyrrhula vulgaris*), p. 64.—Dr. M'Rury included this species in his list of the birds of Barra, on the authority of the Rev. J. Chisholm, R.C. Priest of Castlebay, Barra; but Dr. M'Rury now writes me that this species must still remain on the list in brackets, as there was the possibility of an error in identification. But in a list of rarities observed by Sir Arthur Campbell Orde, *a pair* of Bullfinches are recorded as frequenting the vicinity of Scolpig, in North Uist, in the spring of 1893.

Crossbill (*Loxia curvirostra*), p. 64.—This comes to be added to the Fauna of the Outer Hebrides. A few were seen in Dr. M'Rury's garden on June 30, 1894. In a letter to me, Dr. M'Rury says nine were seen, and two of these were in full male plumage.

Yellow Bunting (*Emberiza citrinella*), p. 65.—As regards Barra, Mr. W. L. MacGillivray writes me that he "just once saw a single Yellow Bunting, and that, *last* year (1901), in May, in our garden"; and he goes on to say: "The doctor (Dr. J. M'Rury) saw one or two a few years ago."

Reed Bunting (*Emberiza schœniclus*), p. 66.—This bird is now reported as nesting in Barra by Dr. M'Rury.

Snow Bunting (*Emberiza nivalis*), p. 66.—Dates of the arrival of this visitor, as observed by Mr. Radclyffe-Waters, are: "First appearance noted on October 1, 1894, and on October 5, 1895. I think they arrive generally about that time, and it occurs very numerously in the Flannan Isles.

Starling (*Sturnus vulgaris*), p. 68.—The vast increase of this bird is equally noticeable in the Outer Hebrides as in many other parts of Scotland. The Outer Hebrides, though an ancient habitat of the species, appears of late years to have participated in this vast increase, whether from internal sources alone, or from accessions from other more distant areas which have become congested, it would not be very easy to ascertain. "Since 1886," writes Mr. M'Elfrish, "starlings have increased immensely. About Lochmaddy alone, there must be hundreds (*sic*), for every one there was in 1886. Great numbers roost in my garden, and all over the islands they may be seen circling in the air in countless numbers."

[Writing to me in 1890, Stoddart—the Newton shepherd—told me of a bird "like a Hooded Crow, but no bigger than a Blackbird." It is possible this may have been a specimen of the Rose-coloured Pastor.]

Chough (*Pyrrochorax graculus*), p. 69.—Dr. M'Rury finds that this species "undoubtedly" occurred in Barra, as recorded by Prof. MacGillivray, and considers that it ought to be permanently included in the Fauna of the Outer Hebrides, although there have been no recent instances of its occurrence in any of the southern islands of the group. I am quite of this opinion, but a more recent record, independently of this old one, enables us to remove all brackets at once. One was shot near Stornoway, Lewis, September 13, 1895, by Mr. Duncan Mackenzie, and recorded ("Ann. Scot. Nat. Hist." 1896, p. 122). There is some good reason to agree with Mr. Mackenzie that this bird may have been in company with the great flights of Rooks. Mr. D. Mackenzie, when I saw him at Stornoway in April 1902, told me he had seen what he took to be a chough, at the same place, twelve months previously—probably the self-same bird he shot.

Jackdaw (*Corvus monedula*), p. 69.—Three remained the greater part of the winter in Barra, having arrived in October 1893. They were in the company of Rooks. Again, on April 17, 1894, eight were seen at Eoligary, and Dr. M'Rury adds: "With exception of a bird or two seen a good many years ago, these are the only records in Barra."

A migration appears to have been conducted for quite a number of years, and has culminated at last in their remaining to breed in the grounds of Stornoway Castle. Mr. Mackenzie of Stornoway relates the facts as follows. When speaking of the advent of Rooks, and their foundation of a colony there, he says: "About half-a-dozen Jackdaws remained from the original lot of migrants" (see under Rook), "and they too have taken to nesting," and "they have apparently come to stay."

Mr. M'Elfrish reports that Jackdaws are frequently seen in North Uist in the first months of the year, "during snow-storm and severe weather." "On one occasion," he continues, "I saw a flock of between 30 and 40 on the farm of Nunton in Benbecula." The Jackdaw has also appeared on migration at the Flannan Isles (Migration Schedules, 1901; see "Ann. Scot. Nat. Hist." 1902, p. 82).

Hooded Crow (*Corvus cornix*), p. 70.—The "Hooded Crow," writes Mr. M'Elfrish, "is a *perfect pest*. Arrives in great numbers in the autumn and winter; and supposing it were possible to kill the last one resident in the isles in the summer, one might be quite sure of a further supply in the winter."

(Under Carrion Crow (*Corvus corone*), Mr. M'Elfrish writes as follows: "I once shot one at Lochmaddy. I had been shooting with Sir Arthur (then Mr.) Campbell Orde; and when walking home to Lochmaddy a pure black bird, which at first I thought was a Raven, was about to fly over my head, just behind the Court-House. I shot it, and it turned out to be a Carrion Crow.)

Rook (*Corvus frugilegus*), p. 71.—New as a nesting species in the Outer Hebrides. It has been known that Rooks in vast numbers migrate to the south coast of the British Isles from across the English Channel. Also, that immense flocks pass along the English south coast in a westerly direction, both in spring and summer and autumn, bulking largest in autumn up to November. After crossing the Channel, they continue along the English side in the direction of the Lizard Point, and then cross the Irish Channel, and often overshoot the western land and are met with far out in the Atlantic by ships homeward bound (*vide* "Field," October 1895, and Migration Reports). My correspondent, Mr. D. Mackenzie, relates as follows, and I prefer to give these notes in his own words: "What I take to be the remnant of this huge migratory body of Rooks,

landed on the west side of our island (The Lews), whilst there were hundreds of them found floating along the shores—dead, of course. The survivors found their way to the Castle grounds here (*i.e.* Stornoway), and I estimated there would be at least 4000 (*sic*). They stayed on during the winter of 1895, and in the spring following they pretty nearly all left, except about 200 which remained during the summer, *but did not nest.* However, about 30 of them nested in the spring of 1897, and they have been increasing in numbers each year since." In April 1902 I counted over 20 nests in one tree, and there are now over 100 nests in all (J. A. H.-B.)

Mr. Mackenzie then speaks of Jackdaws having accompanied the Rooks, and a small proportion of these birds also have taken up their new quarters in the Castle grounds. The Chough, also, which Mr. Mackenzie shot in 1897, he believes "must have come among the Rooks." I consider these notes of great interest from our migrational, and subsequent distributional, points of view.

The Rook is spoken of as a regular spring and autumn visitor to some of the more southerly isles, notably Barra, where Mr. W. L. MacGillivray shot one in May 1901 ; and that gentleman also speaks of their being accompanied by a few Jackdaws, one of which he also shot for his collection in October 1894. Dr. M'Rury says: "Every winter a small flock visits the island ; but in October 1893 very large flocks arrived, and remained till the spring.

The Migration Report for that year also records unusual numbers, viz. : Barra—October 20, in unusual numbers, and on November 2, with Jackdaws. Barra Head—October 30, in flock, with Jackdaws. Monach—January 7, March 18, October 27 to 30, in large flocks, during W.N.W. wind (gale) ; November 1 to 9, in hundreds with some Jackdaws, going towards St. Kilda—gale to strong breeze, W.N.W. and N.E. ; a few observed returning November 10 and 11 and some found dead on shore. The same movement was recorded from Shetland, Orkney, and Argyll and Inner Hebrides stations in the Migration Reports, *q.v.* ("Ann. Scot. Nat. Hist." 1893, p. 217), and about 12 or 15 were seen at Flannan Isles between March 4 and April 3, when one was killed ("Ann. Scot. Nat. Hist." April 1902, *q.v.*).

John Morrison, late keeper at Gress in Lewis, told Mr. Radclyffe Waters "that in the summer he used often to see several Rooks hovering over, and pouncing upon, something on the ground. At first he thought they were robbing grouse-nests, but soon found that they were harrying wild bees' nests."

I think there must be some comparatively new development going on with regard to the dispersal of these Rooks, because the older records of MacGillivray and others, which we referred to in the "Fauna of the Outer Hebrides," pointed only to a visitation of Rooks when driven over from the mainland by severe weather.

This is quite a different movement from the other just described, and, so far as I can see, has never had any influence upon the settlement of the species as a resident. The same movement still continues with little change—*i.e.* Rooks in considerable numbers still visit the Outer Hebrides, but remain a short time, when a big fall of snow has fallen on the mainland. Mr. A. M'Elfrish reports such flocks "about every other year both in North Uist and Benbecula." But it may be perfectly likely that these sporadical emigrations (from the "force of circumstances") may have, in course of time, initiated the greater, until the habit extended, and a great new "line of advance and retreat" has at last been inaugurated. I cannot help looking upon such records as the above as new developments of great interest from the points of view which must be taken of the past and present dispersal of species, and the intimate relationships which exist between migrational and distributional phenomena and the dispersal of animal life.

Raven (*Corvus corax*), p. 71.—No diminution appears to have taken place in the numbers of the bird, though, as Mr. Radclyffe Waters tells me, determined raids are made upon them every spring by the keepers, for they "undoubtedly visit us in large numbers from the mainland," and, "they were very destructive in the nesting season of 1893. On arriving at Galston in September 1894, I found that the keeper had a row of about twenty recently killed, laid out for my inspection." I am myself inclined to attribute this annual immigration to the large numbers which it is well known are to be found in Shetland, and to an emigration of the surplusage from there, though I am quite willing to credit also a much more extensive movement from farther east.

Other accounts bear out the above. Mr. M'Elfrish tells me, for instance, that while a few breed on North Uist, a dead sheep will attract numbers of them. Mr. M'Elfrish has seen as many as twenty-six round one dead sheep.

Swift (*Cypselus apus*), p. 73.—The occurrences of the Swift in the Outer Hebrides being far from common, I consider that records should be kept. The scarcity of records appears to point to an absence of suitable nesting-places, though I do not think that this is the true factor to account for their "visible scarcity." Swifts as often migrate by day, I fancy, as by night. Dr. M'Rury says he does not remember seeing any Swifts in these islands before June 29, August 18, and August 27, 1891. ("Ann. Scot. Nat. Hist." 1892, p. 199—but compare "Fauna of the Outer Hebrides," p. 73). Later, Dr. M'Rury reports that one or two are usually observed every summer on passage by him. Also one at Flannan Isles, June 11, 1900 ("Ann. Scot. Nat. Hist." 1901, p. 135).

Night Jar (*Caprimulgus europæus*), p. 74.—This is an addition to the Fauna of the Outer Hebrides, and is reported from the light-

house of Eilan Ghlaiss, August 14, 1897 ("Ann. Scot. Nat. Hist." 1898, p. 211).

Kingfisher (*Alcedo ispida*), p. 75.—Only on one occasion did Dr. M'Rury see a Kingfisher in Barra, viz. on July 25, 1892.

Cuckoo (*Cuculus canorus*), p. 75.—I cannot help thinking that the Cuckoo has increased considerably throughout the isles since we wrote in 1888. At all events, it is now reported as seen every year on all the islands of the group by more than one correspondent. In this statement I am not taking any notice of the migration at, or past, lighthouses.

(*To be continued.*)

NOTES ON THE COMMON ADDER IN THE HIGHLANDS.

By Lionel W. Hinxman, B.A., F.R.S.E.

During twenty years surveying in different parts of the Northern Highlands I have had many opportunities of observing the nature and habits of the Common Adder, *Vipera berus*. I am also indebted for some interesting facts to my friend and colleague, Mr. B. N. Peach, F.R.S., and to Mr. Dugald Campbell, head stalker in the Strathconon Forest, a keen and accurate observer.

I therefore venture to contribute a few notes on some of the points raised by Dr. Leighton in his valuable paper in the last number of the "Annals."

Adders taking to Water.—On more than one occasion I have seen the Adder take voluntarily to the water. One instance I particularly recall. Bathing one very hot day in July 1884 in a West Sutherland loch, near Cape Wrath, I met an Adder swimming some distance from the shore. I followed him at a safe interval, and when we both landed, slew him from afar with a stone, not caring to come to close quarters in my peculiarly defenceless condition.

Mr. Peach tells me that he has seen Adders swimming, and that they are fond of lying on the wet mossy rocks near a fall, fully exposed to the spray.

A large trout killed some years ago in Loch Ericht

contained the body of an Adder, but whether the fish swallowed the reptile while the latter was swimming, or picked up its body from the bottom, is of course an open question.

Colour.—The general ground-colour of the majority of the specimens I have seen has been brown in various shades. Red is also a common colour, and all the small, and presumably *young*, Adders I have come across have been red, but I have no evidence as to the "Small Red Adder" forming a distinct species or even variety. Melanism is frequent. On 25th April of this year I found a specimen almost completely black, in which the markings were quite obscured. Albinism seems rare. I have only heard of two instances in which it was partially developed, the underparts being of a milky white. In April 1900, in Glen Strath Farrer, I killed a very beautiful Adder, in which the ground-colour was distinctly blue.

Size.—I have frequently met with Adders less than fifteen inches long. On 24th April of this year I found and measured a lively young specimen, seven inches long, and bright red in colour.

Of the many Adders that I have seen and measured, none has exceeded two feet six inches in length, and I doubt whether they often reach three feet in this country. Mr. D. Campbell tells me that the largest Adder he ever met with measured an inch or two over three feet after the head had been cut off.

Animals preying upon Adders.—Mr. Campbell has seen the Common Buzzard preying upon an Adder, and has found their bodies in the dens of foxes. One of the larger Gulls —probably *L. fuscus*—was fired at when carrying something in its bill. The prey was dropped, and proved to be an Adder.

The distribution of the Adder on the mainland seems to be curiously local. During many summers' residence in Mid-Strathspey I hardly saw more than two or three specimens, but have found it extremely abundant in all the valleys of East Inverness north of the Great Glen, and of Easter Ross. On the west coasts of those two counties it is plentiful, and also throughout West Sutherland as far north as Cape Wrath.

There is a strong belief in Easter Ross, and probably in other parts of the Highlands, on the efficacy of a decoction of Adders' head as a cure for the bite of the reptile. The head is soaked in boiling water until the water is coloured yellow, presumably by the contents of the poison gland. The broth is then applied to the wound, and, if possible, also given internally. Mr. Campbell assures me that in this way he completely cured in about three hours a small dog that was badly bitten, enormously swollen, and seemingly almost at the point of death. Evidently a case of *similia similibus curantur!*

THE ADDER IN SOLWAY.

By Robert Service, M.B.O.U.

Though sensibly less in numbers than it was two to three decades ago, the adder is still a very common reptile throughout our area. In the warm summer-time its sinuous trail across the grey, hot dust of the roadways is familiar enough to the cyclist—if his, or her, eyes have been trained to see such things.

Nature-knowledge is being widely taught now, but it is to be feared that it is still, for the most part, a lifeless and artificial thing. Cyclists, therefore, their splendid opportunities notwithstanding, never see anything.

Wherever the condition of the land suits the species, it is comparatively abundant. Of the three counties that constitute Solway, the Stewartry probably holds the biggest adder population, which is specially abundant along the dry, warm, seaboard parishes, where rocky hummocks, covered with bushes and brackens, abound. In Dumfriesshire, Lochar Moss is a locality where adders are particularly common. Along the sheep-farms of the hill-districts the adder has a rather peculiar distribution. In the Eskdale heights it is not uncommon, but along the hills of Annandale it is not at all so, and on some parts may even be reckoned very scarce indeed, while from the hill-country at the head of Nithsdale, westwards to the Rhinns of Galloway, it is quite abundant. The reasons for such inequalities of

distribution, in the absence of any particular diversities of climate, soil, or food-supply, I am unable even to guess at.

These reptiles will come out of their hibernating quarters if the winter sun should shine warmly enough to reach them, but inasmuch as they are generally beyond the reach of transient moods of temperature, their appearance is sufficiently rare to be notable. Even so, I have notes of adders coming forth to bask in the sun in all of the winter months, such appearances being least in December. On 12th March 1900 I nearly stepped upon a lively individual sunning himself on the Moyle hill in Colvend on a patch of moss, completely surrounded by snow, which at the place was about an inch deep. By the middle of April most adders are in full activity for the season. One hears, sometimes, extraordinary stories of writhing masses of them seen at this period on some sunny knoll. "Scores" are sometimes reported, and we are shown these interesting blue beads—the so-called adder beads—of a prehistoric origin, that are picked up on rare occasions, as the products of such an orgie by this assemblage of serpents on a knowe. The imaginations of a certain type of folks, influenced doubtless by some innate idea of the ancient enmity betwixt snakes and humanity, is on such occasions apt to deviate from the strictness of arithmetical accuracy in estimating the number of individuals in the wriggling group. I have never actually counted more than nine in such spring gatherings, although I have no doubt one or two others had escaped before I could count them all, for they scatter in every direction at once when you come upon them.

Of what may be termed comparative statistics in regard to adders I can give two examples. One is by the late Mr. Wilkin, long tenant of Tinwald Downs in Dumfriesshire. When he reclaimed some sixty acres of Lochar Moss an account was kept of the number of adders killed. The total was 2400, showing an average of forty per acre. The reclamations in question extended over several years in the early part of the sixties. The other instance refers to Strongcastle, a farm in the Glenkens of Kirkcudbrightshire. Mr. James Barbour, who, after a long tenancy, left there last

year, thus writes to me under date 19th March 1901: "In reply to your inquiry about the number of adders I have killed on this farm—well, as honestly as I can state, and I kept a careful account every year, there were about 1400 in all. The most for one year was nearly a hundred, and we are nearly forty years here. I have not seen any this year yet, but I have killed them in every month of the year."

A curious but not infrequent resort of the adder in bygone years was the roofs of thatched houses. The march of improvement has almost abolished the use of thatch for dwelling-houses. Over thirty years ago the Gray Horse Inn premises, in the centre of Dumfries, were burned down. The house was notable as containing a portion of the kitchen of the old Greyfriars' Monastery, where Robert Bruce made his historic assault on the Comyn. I well remember seeing a couple of adult adders, that had escaped from the burning thatch, killed by the onlookers.

In my possession is a MS. volume of extracts of paragraphs, etc., relating to natural history matters, copied by myself from the files of the old "Dumfries Courier," a famous naturalist, John M'Diarmid, having occupied the editorial chair of that newspaper for a very lengthy period. A selection of these interesting old paragraphs may here be cited. Under date 31st October 1815, it is stated: "At the time of the late extraordinary flood [which happened on 26th September 1815—R. S.], whilst the people at Borland, in the parish of Balmaghie, were dragging corn off a field which was overflowed by the river Dee, they met with a number of adders, most of which had fled for refuge to the floating sheaves. No less than sixteen were killed. They had no doubt been drawn from their winter retreats in the adjoining meadow, where they are so plentiful that some time ago a man who was employed there in making a ditch in the winter season, on turning up a hillock found under it fourteen of different sizes, but in somewhat of a torpid state."

Here is another paragraph from the "Courier" of 13th March 1821: "On Saturday last, as James Johnstone, peat-man, was levelling moss on the estate of Sir Robert Grierson

of Rockhall, about three miles from this town, he turned up the body of a pretty large adder which he had fairly decapitated before he was aware. This circumstance exciting a suspicion that there were more adders about this spot, he dug a little deeper, when at about 8 inches below the surface he lighted upon a whole encampment of these noxious animals. In particular he took out no fewer than forty adders, which he placed in a box and exhibited in this town as a natural curiosity. Nineteen of those appeared to be full grown, and measured from 18 inches to 2 feet; but at the time we got a peep at this precious family they had all died except two, although these were sufficiently vivacious, and placed themselves in an attitude of defence the moment they were molested. But what is still more surprising, in the same hole there were found ten toads, and an amazing number of small brown lizards of the species well known in Scotland by the name of *Ask*. This last is to us quite a novel fact, although its authenticity can be established beyond the possibility of doubt. In this country it is no uncommon thing to dig up adders even of a larger size than any of those mentioned above, but we never before heard of such a number being found in one hole, and in such company."

The next paragraph to be given concerns another class of facts in the life-history of the adder. The editor of the "Courier," under date 20th June 1826, says: "A respectable correspondent, who communicates his name, mentions the following striking fact. His letter is dated 5th June curt. 'A circumstance of rather an extraordinary nature came under my observation this forenoon. When fishing in the Garple burn, beside the Holm Mill, I caught an eel about 2 feet long, which appeared to have recently swallowed something of considerable size. I showed it to several persons, who were also struck with its bulk. I then laid open the animal with my penknife, expecting to find a trout, or perhaps a frog in its stomach; when, to my surprise, I discovered an adder, about 7 inches in length, quite entire, together with a piece of another which, from its thickness, must have been from 15 to 16 inches in length. That eels do eat vipers is a fact in natural history with

which I was totally unacquainted. The adders are in great numbers about the banks of the Garpel, and the eels probably catch them about the edge of the water, but it seems very remarkable how they get them at all.'"

In the "Courier" for 10th October 1826 the editor again reverts to the foregoing letter, stating that his correspondent was a Mr. Lorimer, and that after dissecting the eel as related, the fish had been flung down. "In the course of the very same week, he (Mr. Lorimer) caught several more eels, and though these appeared to be sound and good, the recollection of what had occurred before excited such a prejudice against them that it was unnecessary to cook what no one would eat. These, therefore, he also flung away under a tree beside the former, and on passing the spot soon after he was surprised to find myriads of flies preying on the eels caught last, and not one attacking the other. . . . Here, then, we have the testimony of a respectable individual to two rather curious facts—first, that eels devour adders; and secondly, that flies have a perception of, and shun any poisonous substance."

Since I first read this paragraph I have often watched a dead adder, and found that flies had no hesitation in sucking its juices, or laying their eggs upon the carcase. To be sure, I have not had the chance of experimenting with an eel that had swallowed an adder. Here is a paragraph that bears upon the former abundance of the adder in the Stewartry: "On Friday week Mr. James Neilson, on the farm of Lochend, about three miles to the south of the Nine-mile Tollbar, killed at one shot seven adders, one of which was as long as a man's arm" (28th August 1832).

For nearly thirty years following, the species is not mentioned in the "Courier" at all. But on 25th September 1860 occurs the following: "Adders are reported as being unusually plentiful in various portions of Scotland this season, and sportsmen and others who have been treading the moors and wilds of Dumfriesshire and Galloway confirm the statement. As the so-called summer has been wet and cold, the abundance of adders, which love heat and sunshine, is rather remarkable. Probably the hot and dry summer of

1859 was favourable to their generation, and hence their present numbers." In the following month adders again come under notice: "Recently we mentioned the rather remarkable fact that adders have been unusually plentiful the last cold and wet summer and autumn. We have since learnt that on one property in this district, from the 12th of August no fewer than thirty-two adders have been killed. Out of those killed one was about to give forth a progeny of sixteen young. Another, evidently not more than a week old, showed fight when disturbed, and on being killed its stomach was found to contain a mouse. A third, but older, when dying dropped from its jaws a young bird, without a feather on its skin. In addition to the prey of the adder just mentioned, the mole may be given. Some years ago an adder was killed in Galloway, from whose distended stomach the body of an unfortunate moudie was extracted" (23rd October 1860).

One more paragraph from the "Courier" and I have done with such quotations. One of the party referred to happened to be an almost lifelong friend of mine: "On Sunday afternoon, as a party were walking down the road above the Upper Saw Mill on the estate of Mabie, parish of Troqueer, they were surprised to see, so late in the season, a large black adder. The reptile, which measured about 2 feet 2 inches long, was crawling across the footpath with a frog in its mouth. A few blows with a switch made the adder give up the frog and the ghost simultaneously" (27th September 1870).

The allusion to a "black" adder brings me to the subject of colour variations in this species. I have never met with either "black" or "white" adders, although it is quite a common thing to hear of such specimens. Very dark adders are frequent enough, but they are only so because the skin has become dull and lustreless. Very pale examples are also well known, but in this case also their old skins have been but recently discarded. Yellowish adders are met with occasionally, but as this shade rapidly leaves them when dead, it has probably only a mere temporary cause, though, for that matter, not any the less interesting on that account. The bright mahogany-coloured variation that Dr.

Leighton speaks of I have met with some half-dozen times. It is a peculiarly agile creature when in this dress, or it may be that it only appears so from some ocular illusion connected with its bright polished colour. I have never seen an individual of this mahogany-coloured variety longer than 15 inches. One such was given me in June 1881 that had been caught by the late William Lennon the entomologist. I kept it alive for about three months in a glass enclosure, when it died, having faded considerably in brightness. It was a particularly vicious viper, and would coil up and strike out on the slightest provocation. Here let me say that I seldom pass an adder without catching and examining it. There is neither difficulty nor danger in doing so, if one is quick enough with eye and hand to note the exact moment to grip the reptile just behind the head. Then it can be examined at leisure and flung down again when done with.

The size to which this species will grow is a vexed question with some. First and last I have seen and handled many hundreds, and the very largest of them is only $24\frac{1}{2}$ inches in total length.

Their food is sufficiently varied. Probably nothing in the shape of frogs, mice, voles, shrews or birds of convenient size, comes amiss. I have taken all the animals named from their stomachs; also nestlings of grouse, partridges, skylarks, yellow hammers, and robins. In October 1889 a certain German vendor of ice-cream, then resident in Dumfries, who occasionally varied his calling by going bird-catching, told me of an incident that happened to him. The Teuton was catching bullfinches at Dalscairth, and had, after the usual and approved fashion, left his call-bird, and gone off a little distance to allow the wild birds to approach. His attention was soon attracted by the terrified flutterings of his call-bird, and on hastily going back to see what was wrong, he found a big adder making a strenuous effort to get into the cage. I shall never forget the tones of great satisfaction in which the aforesaid alien told me how he "smashed dot schnake."

An adder readily takes to the water when disturbed, and I have seen them do so repeatedly in the case of small streams a few feet across. At the west side of Lochaber in

Kirkcudbrightshire, I, one day in July 1893, chased an adder along the water-edge till it sought safety in swimming into the loch and in amongst the sedges. It went out at least six yards, when I lost sight of it in the thick vegetation. Whether these reptiles would of their own free will enter the water may be doubted, but it is constantly alleged that they are found on the islands that abound on so many of our lochs—an allegation, however, that I have never been able to prove for myself.

I cannot refrain from discussing the question that seems inseparable from any paper on the present subject. I would not have done so, had I not been in a position to say something about what Sir Herbert Maxwell so aptly terms "a venerable controversy, the flames of which have broken out afresh lately. Seven lustres must have run their course since a good hare, as old and tough as human credulity, was started in the columns of the 'Field,' and lo! it is running as stoutly as ever" ("Memories of the Months," 1st series, p. 99). That refers, I suppose, to the copious correspondence that took place in 1895 in reference to some pamphlets written by the late Mr. Tootal Broadhurst, who at that time was resident at Terregles, near Dumfries. Mr. Broadhurst issued the first of these pamphlets in 1894. It contained a series of letters, giving statements of when, and where, and how the various writers had seen adders swallow their young when danger threatened. A larger edition, with many additional letters, was sent out in 1895. Many of the writers of these letters are personally known to me, and all are perfectly convinced there was no illusion on their part; but it is easy to see on reading the statements where the link of scientific evidence fails. At the same time as this later pamphlet was issued, Mr. Broadhurst posted a handbill broadcast throughout the country, offering a reward of £2 to any one who would send an adder with the throat tied up and with the swallowed young inside. I was to be referee, and on my certificate the reward was to be paid. It was never applied for. Next year Mr. Broadhurst deposited £10 in the Bank of Scotland in Dumfries, issued a bill in similar terms, offering this sum on similar conditions, but as the said bill was much more widely distributed, Sir William

Flower was to be referee, and to him the adders were to be sent, if caught. Locally, I was authorised by Mr. Broadhurst to grant the requisite certification if an adder with swallowed young was presented. No adder came to me, and if any were sent to Sir William Flower I think I should have heard of it. Since then both Mr. Broadhurst and Sir William Flower have, alas! joined the majority. That being so, there can be no harm in quoting one sentence from a letter received by Mr. Broadhurst from Sir William Flower, which was shown to me, and which shows quite clearly that Sir William Flower's opinion on the matter was that held by all practical zoologists. Sir William said: "That adders swallow their young in moments of danger there is ample evidence—and so is there for the existence of ghosts."

Time passed, and the facts I have rehearsed had fallen well behind, when one day in September 1900 a strange thing happened, as a certain well-known writer would phrase it. A small box was handed to me, along with a letter. Opening the latter, I found it was from Mr. Atkinson, a gamekeeper in Southwick. The contents were startling. Mr. Atkinson stated that he had sent me an adder into whose mouth he had seen young adders run. Thereupon he had killed the reptile, and tied up the mouth, and he added that he believed there was a reward connected with such a discovery, and that I had something to do with it, and would be glad if I would send it (the reward) on. I knew Atkinson as a reliable and most respectable man. Of course I felt excited, but I did not venture to touch the adder until I had sent for a couple of friends, who knew something of internal anatomy, to bear me witness. When they arrived we undid the string round the throat, opened the mouth, and peered down the interior. No young were to be seen. Then we began to dissect the creature. To make a short story of it, we took out seven fully-developed young from the oviduct. There were none elsewhere.

Now, how is it that men used to outdoor life, like Atkinson and many others of similar occupations, are deceived? Their good faith is quite beyond question. Of a surety it is never difficult to see what one thinks one

ought to see. I have year after year seen young adders lying around their mother in autumn. Probably the sudden movement they make towards their parent's head when disturbed starts the illusion. Then she invariably lowers her head, and the young glide out of sight underneath. That is all I have ever seen myself on such occasions.

I would like to remark, in conclusion, that it speaks volumes for the honesty of gamekeepers and others that no attempt has been made to earn Mr. Broadhurst's and other rewards by killing a mother adder, and then inserting several of the young into her throat and tying them inside. It can be done without difficulty. The only time I tried the experiment four young were easily shoved down, and I might have put in one or two more if I had had them.

SOME SCOTTISH ROTIFERS, WITH DESCRIPTIONS OF NEW SPECIES.

By James Murray.

Plates II. and III.

It is proposed in this and following papers to give an account of some of the Rotifers recently found frequenting mosses and hepatics in various situations.

The greater number were found in the concave leaves of *Sphagnum*, many were obtained from the pitchers or hollow leaves of *Frullania* and other hepatics growing on trees or dripping rocks, while a few were got among moss from the sides of horse-troughs.

The method of collecting those living among *Sphagnum* was to gather a handful of the moss from the shallower and dirtier bog-pools and place it in saucers with water in a moderately warm room. Usually a number of species were found when the moss was freshly gathered, which soon after disappeared, being apparently unable to endure the changed conditions. Others only appeared after some days or weeks. These were presumably hatched from eggs. Some of them

agreed so well with the new conditions that they increased prodigiously and abounded in the saucers for months. To obtain those living in the pitchers of *Frullania*, I found it necessary to immerse the moss in water and examine it very shortly after, as the Rotifers very quickly died when kept constantly in still water, notwithstanding the extraordinary power these species possess of withstanding alternate moistening and dessication. Those from hepatics growing in constantly running or dripping water, as at waterfalls, require also to be examined immediately, as they soon die in still water.

A number of species, such as *Callidina quadricornifera* and *C. scarlatina*, were found both in the hoods of *Frullania* and the leaves of *Sphagnum;* while one species, *Philodina rugosa* (Bryce MS.), was first observed among *Sphagnum*, then with hepatics from dripping rocks, and lastly, in the open water of a deep loch.

Bdelloida.

Some 40 species of this Order were observed during the winter months from December 1901 to March 1902, 17 of which belonged to the genus *Callidina*, 13 to *Philodina*, 7 to *Rotifer*, and 3 to *Adineta*, while several of them have not yet been named. A number of the species are believed to be hitherto undescribed or not previously recorded for Britain. These are dealt with in the present contribution.

I must here express my indebtedness to Mr. David Bryce, who has made such valuable contributions to our knowledge of this Order. He most cordially assisted me by looking over my drawings and notes. Without the advantage of his thorough knowledge of the Order, and of the literature dealing with it, I could not have decided whether the animals observed had been previously described or not.

In the drawings of Bdelloida accompanying these notes the cilia of the wreaths are only shown as they appear in a general view, no attempt being made to indicate all their details, as in most instances the animals did not afford sufficient opportunity for the full study of the wreaths;

indeed, several of them never protruded the discs at all. Moreover, as the wreaths seldom afford any good specific characters, attention is first directed to more useful features, such as the rami, the spurs, and the antenna. Then the animals have an unfortunate habit of dying on our hands, which often renders us perforce content with an incomplete study.

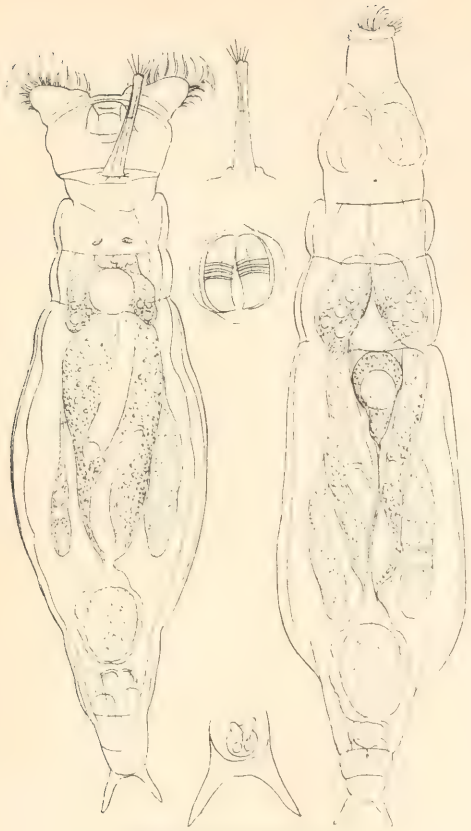
Plate II.

Philodina brevipes, *n. sp.*

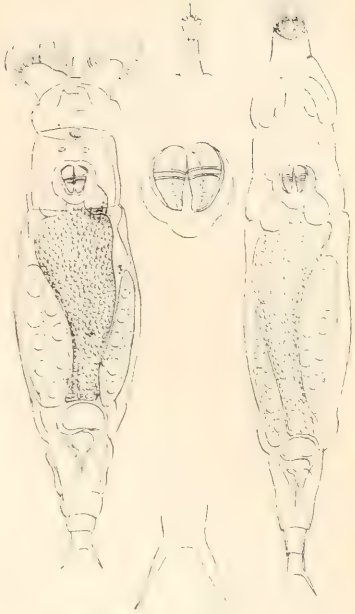
Specific characters.—Large, $\frac{1}{5\frac{1}{2}}$ inch extended, stout, hyaline. Formula 3-3. Column broad, square; lamellæ large. Antenna long, slender, always fully extended, even when feeding. Foot short. Spurs rather small, straight. Eyes brown, oblong, oblique.

Habitat.—Among *Sphagnum*, Blantyre Moor.

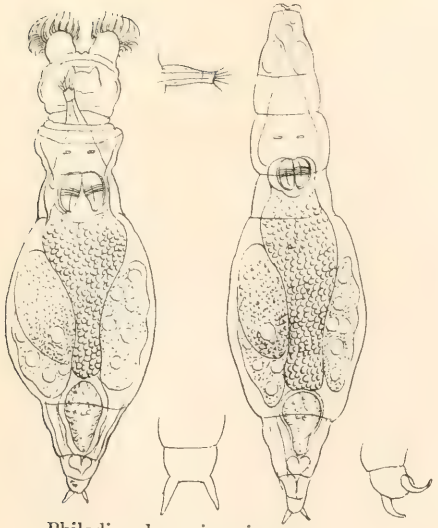
Only one example was observed. It was vigorous but deliberate in its movements, and readily protruded its discs to feed. No fine striæ could be detected on the rami. The glands around the mastax are greatly developed, but are peculiar, and are not readily comparable with homologous organs in a typical Bdelloid Rotifer. Dorsally, a large glandular mass conceals the whole mastax. This contains numerous small vacuoles and one very large central circular cavity. Ventrally, the continuation of this mass is seen, single above, but separating below into two divergent lobes, which join the stomach just about where normal gastric glands would be found. Lower down, opposite the anterior part of the stomach, is a large pear-shaped body having a spherical cavity. This organ is connected by muscles with the mastax, but seems to be quite unconnected with the stomach. It is enclosed in a lax membranous sheath, tapering downwards to the constriction between stomach and intestine. To this constricted part, or to the swelling at anterior end of intestine, it is attached. The organ itself ends below in a fine point, which could only be traced a short distance down the sheath. The ovaries are slightly developed, and appear like narrow sacks pendant from the stomach.



Philodina brevipes, n.sp.



Philodina acuticornis, n.sp.



Philodina decurvicornis, n.sp.

Philodina obesa, n.sp.

J. MURRAY AD NAT. DEL

Philodina acuticornis, *n. sp.*

Specific characters.—Of moderate size, $\frac{1}{70}$ inch extended, all hyaline except stomach, which is yellow. Formula 2-2, rami with fine striæ. Cilia of principal wreath very long. Gastric glands conspicuous, globose, clear. Foot short, spurs small, slender, acute. Eyes small, brown. Antenna short, end 3-lobed.

Habitat.—Among *Sphagnum*, Blantyre Moor.

For about a month this species occurred pretty frequently, Then it disappeared, and has not again been noticed.

Philodina decurvicornis, *n. sp.*

Specific characters.—Small, $\frac{1}{84}$ inch extended. Corona narrow, with deep depression between discs. Formula 2-2. Trunk constricted at level of mastax when feeding. Antenna short. Spurs small, strongly decurved. Eyes pale red, linear, horizontal.

Habitat.—In horse-trough, Newhouse Mill, near East Kilbride.

The only specimen seen was sluggish. It carried a pale yellowish egg. It was all hyaline except the stomach, which was filled with large yellowish oily globules of uniform size.

Philodina obesa, *n. sp.*

Specific characters.—Large, $\frac{1}{58}$ inch extended, very stout, segments bulging. Formula 3-3, rami finely striate. Gastric glands globose, clear. Stomach orange. Foot short, spurs stout, swollen below, separated by a wide space in the centre of which is a prominent papilla. Eyes large, oblong oblique. Antenna of moderate size, stout.

Habitat.—Among *Sphagnum*, Blantyre Moor.

This fine species, of which only one example has yet been seen, was strong and active; survived being pressed flat under cover-slip till the details of the rami were studied; crept about vigorously afterwards, and lived for several days. It did not readily extend its discs while under observation, so that the details of the wreaths were not fully made out. It carried a large brown egg.

Plate III.

Philodina hexodonta, *Bergendal.*

As I am not aware that any figure of this species has been published, and as the examples recently found in Britain present several peculiarities which I have not seen referred to in any notice of the species, I think it is desirable to figure and describe the form which occurs here.

Specific characters.—Of moderate size, $\frac{1}{69}$ inch when extended creeping. Formula 5-5 in all the examples studied. Column constricted below. Antenna long, slender. Eyes crimson, very close together, space between just equal to diameter of eye. Stomach with pellets as in many Callidinæ. Foot short, spurs swollen at base, acuminate, acute, curved outwards and downwards.

Habitat.—In bog-pools; first example among *Sphagnum*, Blantyre Moor; then several among *Hypnum fluitans* from the summit of Nutberry Hill.

Callidina ornata, *n. sp.*

Specific characters.—Small, $\frac{1}{84}$ inch extended, plicate. Formula 3-3, rami with broad yellowish wing, which is scalloped. Antenna long, tactile, with long setæ. Foot short, spurs broad at base, acuminate, acute, with short straight interstice.

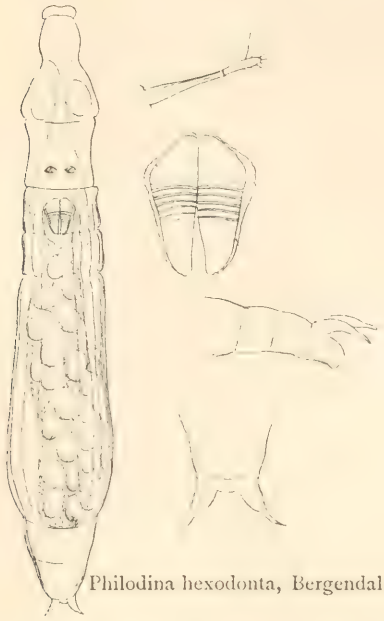
Habitat.—Among *Sphagnum*, Blantyre Moor.

The only example studied was very sluggish in its motions. Though kept alive for some days the corona was never seen extended.

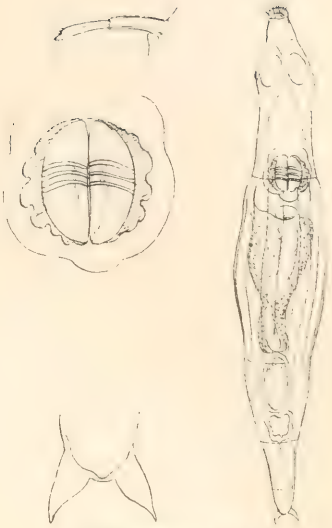
Rotifer quadrioculatus, *n. sp.*

Specific characters.—Rather small, $\frac{1}{66}$ inch extended. Corona small, considerably narrower than trunk. Trunk widest about or below the middle. Foot short for the genus, spurs small, stout, incurved. Stomach yellow. Eyes 4, with many small dots between, the lower pair farther apart than the upper. Formula 2-2.

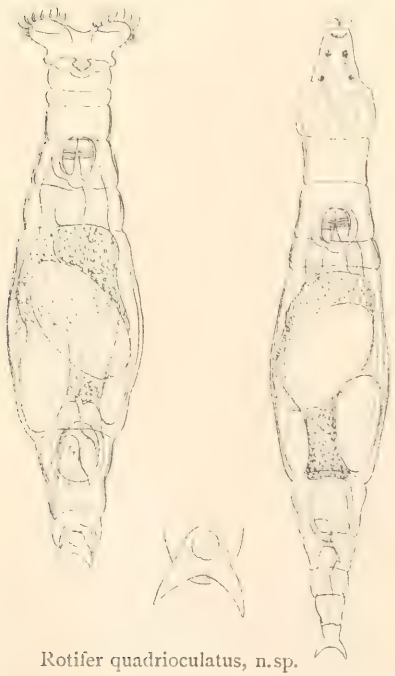
Habitat.—Among *Sphagnum*, Blantyre Moor.



Philodina hexodonta, Bergendal.



Callidina ornata, n.sp.



Rotifer quadrioculatus, n.sp.

Rotifer spicatus, n.sp.

I was at first disposed to regard this as a mere form of one or other of the closely-allied species which form the typical group of the genus; but it was pointed out by Mr. Bryce that the form and the relative proportions of the trunk, corona, and foot were quite different from *R. vulgaris*. As all the characters given above were constant in scores of examples, I have judged it to be a good species, and named it from its most obvious characteristic.

ROTIFER SPICATUS, *n. sp.*

Specific characters.—Of moderate size, $\frac{1}{70}$ inch when feeding, plicate. Antenna short, ventricose, terminal joint globose, with very short setæ. Ventral surface bearing a pair of large spines pointing backward, and on second segment behind those a pair of smaller prominences pointing forward. Foot short, spurs rather long, straight, tapering.

Habitat.—Among *Sphagnum*, Blantyre Moor.

For more than an hour during which it was observed the animal always presented a full profile, and continued steadfastly feeding. No tapping or pressing on the cover-slip could disturb its equanimity or induce it to change its position. I have no doubt that this attitude was due to the sigmoid curvature of the body, acted upon by the cover-slip. Owing to its persistent maintenance of this position only one of the styles and papillæ could be seen, but as they are so obviously lateral it cannot be doubted that they are paired.

A NEARLY FORGOTTEN SCOTTISH BOTANIST.

By Prof. JAMES W. H. TRAIL, A.M., M.D., F.R.S.

WHILE consulting the very useful "Biographical Index of British and Irish Botanists" recently, I happened to note that the record relating to JAMES BEATTIE is an exception to the usual accuracy of the notices in the volume. It runs as follows:—

"JAMES BEATTIE (1735-1803), b. Laurencekirk, Kincardine, 25 Oct. 1735; d. Aberdeen, 18 Aug. 1803. M.A. Aberdeen, 1753; A.L.S. 1807. Prof., Aberdeen. Added

Linnæa to British Flora, E.B., 433. Life by Sir W. Forbes, 1806; Smith, Lett. 1, 441-3; Dict. Nat. Biog. iv. 23."

The greater part of this refers not to the correspondent of Sir James Edward Smith but to the much better known Professor James Beattie, the author of "An Essay on Truth" and other philosophical works, which like his poems, especially the "Minstrel," enjoyed a very high reputation about the end of the eighteenth and beginning of the nineteenth centuries. The Life by Sir W. Forbes and the notices in the biographical collections, so far as I am aware, all refer to the poet. He was born in 1735 in Laurencekirk, and studied in Aberdeen in Marischal College and University,—then a keen rival of King's College and University, though the two universities were only about a mile apart. (Since 1860 they have happily been united as parts of the University of Aberdeen.) In 1753 he became M.A. of Marischal College and University, where in 1760 he received the chair of Moral Philosophy. In 1787 his eldest son, James Hay Beattie, was appointed his colleague and successor in the chair, but died in 1790. In 1797 Professor Beattie ceased to lecture (a colleague and successor, George Glennie, having been appointed in 1796); and he died in 1803.

The botanist, James Beattie, junior, was a nephew of the poet. He also was born in Laurencekirk, but the date of his birth is uncertain, and little is known about his private life. He studied in Marischal College and University; graduated M.A. in 1783, and became Professor of Civil and Natural History in that university on 22nd October 1788. He married in 1794, and had a family of four sons and two daughters. He died on 5th October 1810. The scope of the subjects taught in the class of Civil and Natural History by his successor, Dr. James Davidson, is detailed somewhat fully in existing documents, and ranged over astronomy, light, electricity, galvanism, magnetism, gravitation, chemical union, the atmosphere, meteorology, geology, mineralogy, constituent principles of vegetables, physiology of plants, outlines of the Linnean system, animal chemistry and physiology, and the natural and civil history of man. Two hours daily in a winter session were devoted to the above,

and an hour daily, "for four months, to the study of the Latin language, in which the students generally read the 'Georgics' of Virgil, as being not only models of the most perfect Latin composition, but as affording grounds for illustrating the knowledge of the ancients with regard to natural history."

We have no information as to Professor Beattie's course; but we may infer that he was a botanist by preference, and had a knowledge of the science much superior to that of his successor. It is on record that he taught classes of Botany numbering between ten and twenty students between 1801 and 1810, and that after his death Botany was taught by lecturers, with occasional intervals, until the chair was founded on the union of the universities in 1860.

But a still more clear evidence of his interest in and successful study of the flora of Scotland is afforded by the earliest volumes of the "Transactions of the Linnean Society" and the "Flora Britannica" of Sir James E. Smith, to whom plants were sent by Professor Beattie from "Mearnsshire" (Kincardine) and from near Aberdeen. He is usually named as the first discoverer in Britain of *Linnæa borealis*, at Inglismadie in Mearnsshire. He also forwarded examples of *Carices*, referred to by Sir J. E. Smith in his original descriptions ("Trans. L. S." v. pp. 266-273, read 3rd December 1799) of the species as previously unknown. Among these were :—

C. binervis, very common on the driest moors about Aberdeen.

C. lævigata, marshes near Aberdeen.

C. Micheliana, near Aberdeen. First described as a new species, but afterwards referred by its author to *C. recurva* (= *C. flacca*).

C. Davalliana. A specimen "discovered in marshy ground in Mearnsshire by Professor James Beattie, junior, of Aberdeen," sent by him as a form of *C. dioica*, but confidently determined by Smith to be distinct, though not confirmed by other botanists, and now usually regarded as due to error.

C. teretiuscula, Good., is another scarce and local sedge detected by Professor Beattie near Aberdeen.

SCOTTISH RUBI.

By Prof. James W. H. Trail, A.M., M.D., F.R.S.

The genus *Rubus* has within recent years been the subject of careful revision (especially in England and Wales), with the aim of determining the relations of the forms that exist in Britain to these of the continent of Europe. Many changes have had to be accepted in the nomenclature; and several new forms have been recognised as distinct from those already named or known as British. Foremost among British students of Rubi is the Rev. W. Moyle Rogers, F.L.S., to whose papers in the "Journal of Botany," followed by the "Handbook of British Rubi" in 1900, we owe most of the great recent advance in this study. Mr. Rogers has added to the debt under which these publications has laid us by his readiness to examine and name the collections of other botanists, who have frequently benefited by his kindness. We in Scotland have to thank Mr. Rogers also for the great additions he has made to our records of Rubi in Perthshire and in several counties of the west and south-west of Scotland, the lists for those counties alone approaching fulness.

In a recent paper in the "Journal of Botany" Mr. Rogers has summed up our present knowledge of the distribution of the genus in Great Britain and Ireland. Though the Scottish lists are much extended since those in the second edition of Watson's "Topographical Botany," published in 1883, they are still very meagre, and prove that there is yet much to be done. We cannot expect that many forms will be found in the islands and the northern counties, yet even in them additions should reward a careful search. Mr. Rogers has shown how much richer in forms the counties visited by him are than might have been anticipated from previous records; and no doubt in all the other southern and midland counties many unrecorded forms occur.

Of the 169 forms of Rubi that have been distinguished in the British Islands, only 65 are known with certainty from Scotland, in marked contrast to the 164 that have been met with in the southern half of England (121 of

these in the county of Hereford alone), with a general average of 40. The average of forms as yet recorded with certainty from Scottish counties is but little above 11, while the highest number (for West Perth and Mid Perth) is only 32. Several vice-counties are almost unrepresented. Omitting those counties in which fruticose Rubi are known to be scarce, Mr. Rogers states that (besides *R. idæus*, which has been found in all the vice-counties) of forms accurately and clearly determined, Peebles and Haddington yield 1 each, Selkirk and Edinburgh 3 each, Roxburgh 4, Lanark and Forfar 6 each, Berwick 7, Dumfries, Fife, and Elgin 8 each, while the records for most of the other counties are evidently very defective.

Owing to the numerous changes in nomenclature resulting from recent researches in the genus, the older floras and lists cannot now be relied on except for *R. idæus*, *R. saxatilis*, and *R. chamæmorus*, and possibly for *R. corylifolius* in the collective sense. "*Rubus suberectus*" and "*R. rhamnifolius*" of these lists may each represent any one of several forms now distinguished from each other. Even the lists of "Topographical Botany," ed. 2, cannot be implicitly followed. Yet I have thought it may help towards a more accurate and full investigation of the Rubi in Scotland if what is already on record for each vice-county and for each form is brought together and placed at the service of those interested in the Flora of Scotland. In what follows I have endeavoured to do so, drawing the information from numerous sources, and indicating briefly for most forms the name of the observer, and where the record may be found. Most of these indications are given in full when first mentioned, and abbreviated in later references.

Some works and papers refer to several vice-counties or to the whole country, and are frequently referred to. These are H. C. Watson's "New Botanist's Guide" (issued for Scotland in 1837), his "Topographical Botany," ed. 2, 1883, a list by Mr. Rogers in the "Journal of Botany" in 1895, his "Handbook of British Rubi," published in 1900, in which the earlier records were revised and corrected, and a paper by him "On the Distribution of Rubi in Great Britain," in the "Journal of Botany" (April 1902), and the

continuous series of "Records" by Mr. Bennett additional to "Topographical Botany." These are abbreviated respectively as "N.B. Guide," "Top. Bot.," "Handbook," and "1895 List," or *W. M. R.*, and "Add. Rec." followed by the year. In the county lists R denotes forms accepted by Mr. Rogers as correct, (R) denotes records regarded by him as probably correct, and [R] those requiring investigation. After the several county lists follows a systematic list of the forms, and after each an abstract by numbers of the districts in which it has been noted. These numbers are grouped thus: those that are in ordinary figures not inclosed in brackets are accepted by Mr. Rogers as absolutely trustworthy, in the "Handbook" or in subsequent communications. Those in similar figures but in round brackets, thus (88), are regarded by him as practically trustworthy, though not seen by him in or from the district; similar figures in square brackets show that he regards the records as much in need of confirmation; and *italics* denote districts not included for the several forms in Mr. Rogers' book or papers, though mentioned elsewhere, as stated under the several vice-counties. Some of these records are probably correct, while others are certainly erroneous; but the uncertainty that attaches to them renders them of use chiefly as suggesting queries for investigation in the districts referred to.

After the systematic list follows an abstract of the records in Hennedy's "Clydesdale Flora," Sonntag's "Flora of Edinburgh," and Ewing's "Glasgow Catalogue" of certain forms mentioned in these works as occurring in districts not elsewhere noted. These also may be regarded as subjects for further investigation.

72. Dumfries.

R. idæus.—R.

var. obtusifolius. *A. Craig-Christie*, 1887, "Add. Rec. 1887."—R.

R. fissus. "Top. Bot."; "Near Moffat, *C. Bailey*, 1898."—R.

R. suberectus. "Top. Bot."—[R].

R. plicatus. "Top. Bot."—[R].

R. affinis. "Top. Bot."; "Upper Nithsdale," *Fingland*, 1895.

R. carpinifolius. "J. Sadler, 1858," "Flora of Dumfries."

R. Lindleianus. "E. F. Linton, 1890," "Fl. D."—(R).

R. rhamnifolius. *Scott Elliott*, 1893, "Fl. D."

R. pulcherrimus (as *cordifolius*). *Fingland*, "Add. Rec. 1891," 1893, "Fl. D."
R. villicaulis (as var. *insularis*).—R.
R. macrophyllus. "Fl. D."; *Ar. Bennett*, "Add. Rec. 1887."—R.
subsp. Schlechtendalii.
var. amplificatus. 1891, *Fingland*, "Add. Rec. 1891"; near Closeburn Castle, *Fingland*, 1895.—(R).
R. infestus. *Fingland*, "Add. Rec. 1891"; Drumlanrig Bridge, *Fingland*, 1895.—[R].
R. radula (*s. lat.*). "Top. Bot."; near Thornhill, *Fingland*.—[R].
[R. humifusus. "Top. Bot." (=*R. pallidus*, W. and N.)].
R. Koehleri. Auldgirth, 1887, *Fingland*, "Add. Rec. 1887."
subsp. dasyphyllus (as var. *pallidus*). "Top. Bot."; by Moffat Water, *Lintons*, 1890.—(R).
R. corylifolius. 1900.—R.
R. saxatilis. "J. Sadler, 1858," "Fl. D."—R.
R. Chamæmorus. "Rev. W. Singer, 1843," "Fl. D."; "Add. Rec. 1886."

73. Kirkcudbright.

R. idæus.—R.
R. fissus. "*J. M'Andrew*," "Add. Rec. 1887."—[R].
R. suberectus. "Galloway" in J. Ball's Herbarium at Kew.—(R).
R. affinis. Borgue, *C. Bailey*, 1890.
R. rhamnifolius. "F. R. Coles, 1893," Fl. D.—(R).
R. Scheutzii. Near Dalbeattie, *Bailey*, 1899.—R.
R. pulcherrimus.—R.
R. villicaulis, *subsp.* Selmeri. "Dalbeattie to Urr, *Bailey*, 1899.—R.
[R. macrophyllus. "*J. M'Andrew*, 1882," "Fl. D."]
R. Sprengelii. 1889, *C. Bailey*.—R.
R. radula. *G. C. Druce*, 1883.—[R].
R. Koehleri. *M'Andrew*, "Add. Rec. 1887."
subsp. dasyphyllus. Dalbeattie to Urr, *Bailey*, 1899.—R.
R. plinthostylus. A specimen gathered by *C. Bailey* near Borgue was so named by C. C. Babington, but the record greatly needs confirmation.—[R].
R. hirtus. "*J. M'Andrew*," "Add. Rec. 1887."—[R].
R. corylifolius (*s. lat.*). "P. Gray, 1848," "Fl. D."—R.
var. sublustris.—(R).
R. Balfourianus. "Field Club, 1893," "Fl. D."
R. cæsius. Coast in Colvend, *J. Fraser*, 1883.
R. saxatilis. *N. B. G.* 1837; "Gray Catalogue," "Top. Bot."—R.

74. Wigton.

R. idæus. *G. C. Druce*, 1883.—R.
R. suberectus. *G. C. D.* 1883.—[R].
R. plicatus. "Top. Bot."; near Stranraer, 1901, *F. A. Rogers*.—R.

R. affinis. "*Balfour*," "Top. Bot."
R. incurvatus. 1900.—R.
R. Lindleianus. *C. Bailey*, "Add. Rec. 1890."—(R).
R. rhamnifolius. *C. Bailey*, 1883; near Stranraer, 1901, *W. M. R.*—R.
R. Scheutzii. Near Stranraer, 1900, *W. M. R.*—R.
R. pulcherrimus (as *polyanthemus*). *C. Bailey*, "Add. Rec. 1890."—R.
R. villicaulis, *subsp.* Selmeri. G. C. Druce, 1896; generally common, 1901, *W. M. R.*—R.
R. argentatus. 1900.—R.
R. rusticanus. Coast, N. of Stranraer, 1901, *W. M. R.*—R.
R. macrophyllus, *subsp.* Schlechtendalii. Near Stranraer, 1901, *W. M. R.*—R.
R. Sprengelii. 1889, *C. Bailey*.—R.
R. hirtifolius, *var.* danicus, 1900.—R.
R. pyramidalis. Near Stranraer, 1901, *W. M. R.*—R.
R. anglosaxonicus, *subsp.* raduloides. Stranraer, 1901, *W. M. R.*—R.
R. infestus. 1900.—R.
R. Borreri.—[R].
R. radula.—R.
R. rosaceus, *var.* hystrix. Stranraer, 1901. *W. M. R.*—R.
R. Koehleri, *subsp.* dasyphyllus. Borgue, *Bailey*.—R.
R. hirtus. Borgue, 1889, *Bailey*.
R. corylifolius. Whithorn, 1883, *Bailey*.—R.
var. sublustris.—(R).
var. cyclophyllus.—(R).
R. cæsius. *G. C. D.* 1883.—R.
R. saxatilis, *G. C. D.*, "Add. Rec. 1887."—R.

75. Ayr.

R. idæus.—R.
R. fissus. In *W. M. R.'s* list in 1895, but omitted from "Handbook" as not properly authenticated.—R.
R. Rogersii. Colmonell, 1901, *W. M. R.*—R.
R. plicatus. Pinwherry, Colmonell, 1901, *W. M. R.*—R.
R. Lindleianus. Frequent, 1901, *W. M. R.*—R.
R. rhamnifolius. Colmonell and Glen App, 1901, *W. M. R.*—R.
R. Scheutzii. Ballantrae, 1901, *W. M. R.*—R.
R. pulcherrimus. Very common, 1901, *W. M. R.*—R.
R. Lindebergii. Colmonell, 1901, *W. M. R.*—R.
R. villicaulis, *subsp.* Selmeri. "Very common," 1901, *W. M. R.*—R.
R. rusticanus. "Balfour" (as *discolor*), "Top. Bot."; Ballantrae, 1901, *W. M. R.*—R.
R. pyramidalis. Skelmorlie, 1901, *W. M. R.*—R.

R. melanoxylon. Skelmorlie, 1901, *W. M. R.*—R.
R. infestus. Colmonell, 1901, *W. M. R.*—R.
R. radula. Ballantrae, 1901, *W. M. R.*—R.
R. Koehleri, *subsp.* dasyphyllus. Skelmorlie, etc., 1901, *W. M. R.*—R.
R. corylifolius. Locally abundant, 1901, *W. M. R.*—R.
var. sublustris. Colmonell, 1901, *W. M. R.*—R.
var. cyclophyllus. Colmonell, 1901, *W. M. R.*—R.
R. cæsius. Pinwherry to Ballantrae, 1901, *W. M. R.*—R.
R. saxatilis. "Duncan's Catalogue," "Top. Bot."—R.
R. Chamæmorus. Cairntable.

76. Renfrew.

R. idæus.—R.
R. suberectus. "Top. Bot."—[R].
R. plicatus. Kilmalcolm, 1901, *W. M. Rogers.*—R.
R. Rogersii. Kilmalcolm, 1901, *W. M. R.*—R.
R. affinis. "Top. Bot."
R. incurvatus. "*Balfour*," "Top. Bot."—(R).
R. Lindleianus. "Top. Bot."; "Frequent," 1901, *W. M. R.*—R.
R. rhamnifolius. 1901, *W. M. R.*—R.
R. Scheutzii. Langbank, 1901, *W. M. R.*—R.
R. pulcherrimus. "Very common," 1901, *W. M. R.*—R.
R. villicaulis, *subsp.* Selmeri. "Very common," 1901, *W. M. R.*—R.
R. macrophyllus. Ashton, 1901, *W. M. R.*—R.
R. melanoxylon. Kilmalcolm, etc., 1901, *W. M. R.*—R.
R. infestus. Ashton, 1901, *W. M. R.*—R.
R. radula, *subsp.* sertiflorus. Kilmalcolm and Ashton, 1901, *W. M. R.*—R.
R. echinatus (as *rudis*). "Top. Bot."—(R).
R. Koehleri, *subsp.* dasyphyllus. On hill above Ashton, 1902, *W. M. R.*—R.
R. corylifolius. Locally abundant, *W. M. R.*—R.
var. cyclophyllus (as var. *conjungens*). "Top. Bot."; Ashton, 1901, *W. M. R.*—R.
R. cæsius. Ashton, 1901, *W. M. R.*—R.
R. saxatilis. "Hennedy's Catalogue," "Top. Bot."—R.

77. Lanark.

R. idæus. *Hopkirk*, in "Fl. Glott." 1813.—R.
R. fissus. *C. H. Waddell*, "Add. Rec. 1899."—R.
R. plicatus.—[R].
R. affinis. "Add. Rec. 1887," "M'Kay, *teste* Ar. Bennett," but no authentic specimen seen from north of Anglesey; probably the plant was *Selmeri*; *W. M. R.*

R. villicaulis, *subsp.* Selmeri.—[R].
R. hirtifolius. *C. H. Waddell*, "Add. Rec. 1899."
var. danicus.—R.
R. corylifolius. *Hopkirk*, in "Fl. Glott." 1813; *C. H. Waddell*, "Add. Rec. 1899."—R.
var. sublustris.—(R).
R. saxatilis. *Hopkirk*, in "Fl. Glott." 1813; "Hennedy, Catalogue," "Top. Bot."—R.
R. Chamæmorus. *Hopkirk*, in "Fl. Glott." 1813; "Top. Bot."—R.

(*To be continued.*)

ERICA STUARTI, NOV. HYBR.

By E. F. Linton, M.A.

In a notice of the late Dr. C. Stuart in the last number (p. 65), *Erica Tetralix Stuarti* is said to commemorate "his discovery of a very distinct subspecies of heath in Connemara." I understand that this view obtained at first; but when I received specimens nearly two years ago from Mr. W. B. Boyd, I learnt that he and Dr. Macfarlane considered the *Erica* to be a hybrid of *E. Tetralix* and some other.

On examination I was convinced that the new heath was a hybrid between *E. mediterranea*, L. (*E. hibernica*, Syme) and *E. Mackaii*, Hook.; and Dr. Stuart, on seeing my opinion and comments, wrote to me at once that he was disposed to consider it the correct one. But it does not appear that this opinion or any description of the plant has been put on record.

Unlikely as this combination would be, on account of the difference in the flowering season, the dark brown anthers, distinctly though slightly exserted in *E. Stuarti*, can only be accounted for by descent from *E. mediterranea;* the narrow corolla and its pale colour in the lower part afford strong confirmation; and though the species is normally a spring-flowering one, the flowers are apt to linger on, or else the plant flowers again, as I have witnessed in my own garden.

Then *E. Mackaii* seems to be required as the other parent rather than *E. Tetralix* by the hairy stem or at least young twigs, by the broad leaves, which are almost identical with those of *E. Mackaii* in shape and clothing, and perhaps as well by the colouring of the upper part of the corolla and

the compact clusters of flowers. In *E. Tetralix* the twigs are tomentose, not hairy, and the leaves lanceolate or linear, pubescent above and mealy all over beneath. The following may serve as a description :—

Erica Stuarti, nov. hybr.—Leaves in whorls of four, or irregularly scattered, ovate-oblong or lanceolate, ciliate, glabrous above, puberulous (mealy) beneath except on the glabrous midrib, margins revolute ; young twigs hairy ; sepals ovate-acuminate ciliate, puberulous towards the tip ; corolla cylindric-urceolate, nearly white below, shading upwards to deep rose-purple ; stamens and styles somewhat exserted ; ovary nearly glabrous with a few hairs upwards.

A NEW FORM OF *EUPHRASIA CURTA*, FR.

By Prof. James W. H. Trail, A.M., M.D., F.R.S.

Among numerous gatherings of *Euphrasiæ* made by me during 1900 and 1901, which Mr. Frederick Townsend, F.L.S., very kindly examined and named for me, there was one form of especial interest which he identified as previously known to him only from the Shetland Islands, where it had been found by Mr. W. H. Beeby on Serpentine hills about 200 feet above Baltasound in 1897, and from Wales, where it had been found by Rev. W. R. Linton at about 1500 feet altitude, on silurian and trap hills, near Bethesda, Carnarvonshire, in 1900. The specimens gathered by myself, on 9th September 1901, were growing plentifully on the side of a turf bank near the loch of Loirston in Kincardineshire, on poor granite soil, at about 270 feet above the sea.

This form Mr. Townsend regards as belonging to *E. curta*, Fr., but as very distinct from any named form of that plant. He has therefore given to it the name of *piccola*, as a new variety, and has permitted me to make what use I please of his manuscript. Of this permission advantage is now taken to give his description and diagnosis below, as prepared from the specimens brought from Shetland by Mr. Beeby.

"*Euphrasia curta*, Fr., *forma piccola*," Townsend, in MS., "*caulis tenuis erectus*, $2\frac{1}{2}$-3 *cm. altus*, *simplex* sed infra

medium ramis curtissimis flores non gerentibus instructis, setis crispulis albidis reversis pubescens, rubescens vel fuscescens? Folia numerosa, internodiis plerumque brevibus, obtusa cuneato-ovata, inferiora opposita dentibus utrinque 1-2 obtusis, superiora subopposita vel alternantia dentibus utrinque 3 obtusis. Bracteæ alternantes, in tertia parte inferiore latissimæ, inferiores obtusæ vel acutæ *dentibus utrinque* 3 *acutis*, superiores acutæ, dentibus 2-3 acutis. Folia omnia planiuscula, sicca nigricantia, *in pagina superiore et inferiore setis sublongis crispulis albidis obsita. Flores pauci* subsessiles *in spica brevi, fructu paululum elongata. Calyx indumento* ei foliorum et bractearum similis, dentibus triangularibus acutis. *Corolla parva* 3-4 *mm. longa* alba labiis æquilongis striis (cœruleis?) notata; lobi labii inferioris subæquales, emarginati, macula flava picti; lobi labii superioris integri. Stigma curvatum. *Capsula* superne *lata truncata* vix emarginata, basin versus angustata, longitudine latitudinem circa duplo-superans, *calycis dentes non superans plerumque subæquans superne pilosa margine longe ciliata.*

"*Euphrasia piccola* is a remarkably elegant plant; its slender unbranched stem (though doubtless the short branches or buds in the axils of the lower leaves would occasionally become developed), its numerous leaves and short internodes, its few and small flowers, and comparatively abundant long white pubescence are very noticeable characters. Our plant differs from *E. micrantha*, Brenner, by its flowers, which exceed the bracts, the latter being acutely, not obtusely toothed, by the entire lobes of the upper lip of the corolla, and by the pubescence just alluded to. From dwarf unbranched specimens of the usual type of *curta*, Fr., it differs by its much smaller flowers, smaller and obtusely toothed leaves, smaller bracts, and much more slender habit; from *E. mollis* by its more numerous leaves and short internodes, its fewer-toothed bracts, and the entire lobes of the upper lip of the corolla; from *E. gracilis* by its smaller corolla, the upper and lower lobes of which are equal, by its obtusely-toothed leaves, and by the presence of the almost shaggy white pubescence; from small specimens of *E. scotica* by the last-named character, and by the much smaller ovate (not cuneate-oblong) leaves and bracts."

THE HERBARIUM (*HEPATICÆ*) OF THE LATE Mr. JOHN SIM.

By Symers M. Macvicar.

I HAVE recently had the opportunity of examining this herbarium through the kindness of Mrs. J. Sim and the instrumentality of Professor Trail. It is composed of several hundreds of specimens from Scotland, with a few from other parts. I shall refer here only to some of the Scottish plants gathered by Sim, but there is also in the herbarium a large number of plants which were gathered by the Rev. Dr. Fergusson, Fearn, mostly from the counties of Forfar and Perth. The packets are partly mounted on sheets, and partly loose. There are 106 species from Scotland represented, the large majority having been gathered by Sim in Kincardine and Aberdeen, with some collected in various parts of Shetland during a visit in 1878. Some of the specimens are of much interest, either for their rarity, or for their distribution in our country. Among these are the following. When the locality is not definitely stated it is to be understood to be in the northern part of Kincardineshire, in which district Sim resided.

Frullania fragilifolia, Tayl.—In several localities, and in Unst and at Busta in Shetland. *F. germana*, Tayl.—In two stations near Lerwick. This Atlantic species, hitherto only known from the British Isles, has recently been identified from the Færöes by Herr C. Jensen. *F. dilatata* (L.).—This widely-spread species of our sheltered low ground is rare in exposed northern parts of Scotland. It has only been found in small quantity by the Rev. D. Lillie in Caithness, where it appears to be confined to planted trees; and it has not been found on the Færöes, which have a very similar hepatic flora to our own. It was therefore interesting to see two specimens of the species in Sim's herbarium from rocks near Lerwick.

Herberta adunca (Dicks.).—From Unst, Shetland, there is a minute black form with leaves which are not secund. I have seen a somewhat similar plant from the summit of Craig Chailleach, Killin.

Chandonanthus setiformis (Ehrh.).—The var. *alpina* from Slack of Birnie in Kincardine. I have not been able to trace this station with absolute certainty, but Mr. J. W. Fordyce, Inchmarlo, who has kindly supplied me with information on the topography of the district, points out that this almost certainly refers to Birnie Hill on Cairn-o'-Mount. The interest of the station lies in its low altitude (900 ft.) for the plant. The next lowest that I know of is on Carn Dearg, Aviemore, at 1200 ft.

Lepidozia cupressina (Sw.).—Yell, Shetland. This is the most northern locality, so far, for this Atlantic species. *L. trichoclados*, C. Müll.—Kerloch, Kincardine, with female inflorescence, 1878. First described as a British species distinct from *L. setacea* in "Journal of Botany" for April of present year. Sim's plant is the earliest Scottish one, so far as yet known.

Cephalozia Lammersiana (Hüben.).—From two localities, 1879. *C. Francisci* (Hook.).—There is a specimen of this rare species, with perianths, from Peter's Hill, Birse, Aberdeen.

Pleuroclada islandica (Nees).—Lochnagar, 1876. The only other locality in Scotland for this high alpine plant, from which I have seen a specimen, is the rather unexpected one of Goatfell in Arran. This was gathered by Mr. Adamson in 1840, and is in Professor Dickie's herbarium, the hepaticæ of which I have had the opportunity of examining through the kindness of Professor Trail.

Hygrobiella laxifolia (Hook.).—Several localities near the borders of Kincardine and Aberdeen; also from three places in Shetland.

Scapania subalpina (Nees). — From several localities. This species is frequent in subalpine parts of Scotland. *S. nemorosa* (L.).—One locality, also from Lochnagar. An uncommon plant in Scotland. What is found under this name in the older herbaria is generally *S. resupinata*, Dum. or *S. purpurascens*. *S. rosacea* (Corda). — Kerloch. *S. umbrosa* (Schrad.).—An interesting locality for this species is Shetland. It has not been found on the Færöes, and it appears to be rare on the less sheltered parts of the west coast of Norway.

Diplophyllum obtusifolium (Hook.).—A specimen of this rare species from Gateside, Strachan, 1878. It is accompanied with *D. albicans*, as has been usually the case in the few Scottish plants which I have seen; but it can be distinguished from that common species by the absence of the white line of cells in centre of leaf, and by its paroicous inflorescence. *D. Dicksoni* (Hook.).—From several places in Kincardine and Aberdeen, frequently with *Jung. minuta.*

Plagiochila spinulosa (Dicks.). — One specimen from Crathes wood, Kincardine. This common western species is very rare towards the east coast. There is a specimen from St. Andrews in the late Charles Howie's herbarium.

Jungermannia atrovirens, Schleich.—Northmavin, Shetland, with perianths, associated with *Ceph. bicuspidata*, *Scap. purpurascens*, *Nardia scalaris*, and *Aneura ambrosioides*. *J. sphærocarpa*, Hook.—Kerloch, 1879. This species, which is given as being generally distributed in England, is rare in Scotland according to my experience. *J. autumnalis*, DC. —Den of Lathers, Kincardine, 1878. This plant has been recorded from few places in Scotland. It is probably uncommon, but should be looked for on half-buried stones and boulders in places shaded by trees. There is a specimen of the very rare var. *Schraderi*, a plant of wet ground among *Sphagnum*, in the Edinburgh Herbarium, labelled from "Scotch Alps," gathered by Drummond about the year 1847. It does not appear to have been found in Scotland since then. *J. Flœrkii*, Web. and Mohr.—A specimen of var. *Baueriana*, Schiffn., from Invery, Kincardine, 1879. This variety, which has not, I think, been previously mentioned as British, is described by Professor Schiffner in his paper on *Jung. collaris* in "Oesterr. bot. Zeit." 1900, No. 8. It is an intermediate plant between *J. Flœrkii* and *J. lycopodioides*. The leaves are generally four-lobed, the middle lobe being the largest, and the dorsal lobe the smallest; they are all usually pointed, with one or more ending in a long cilium. There are also frequently long cilia at the base of postical margin of leaf. I have seen specimens of this variety from several localities on the east side of Scotland, usually from places at a small elevation above sea-level, but I have not, so far, seen it from the west coast. It is liable to be mistaken for *J. lycopodioides*,

but this latter is, I think, solely an alpine plant with us. *J. capitata*, Hook.—Two localities, 1880. *J. bicrenata*, Schmid. —From three localities, and from one in Shetland. Although recorded from few places in Scotland, I expect that this species will be found to occur in most counties. The small size of the plant has probably led to its being overlooked; but it is easily known by the reddish brown colour of the nearly erect, rather acutely-lobed leaves, and the upper half of perianth deeply plicate, with the apex hyaline. The usual locality for it is on a dry thin layer of soil among rocks or stones. *J. alpestris*, Schleich.—Lochnagar, 1876. *J. bantriensis*, Hook.—The typical plant from Balham bog, Kincardine, 1875.

Marsupella aquatica (Lindenb.) Schiffn.—Lochnagar and Mavisgrind, Shetland. This has usually been described as a variety of *M. emarginata*, but Schiffner, Stephani, and others consider it a good species. It is the *Nardia robusta* of Lindberg, and is a frequent plant in subalpine districts of Scotland. Principally distinguished from *M. emarginata* by its generally larger size, often elongate when in streams, leaves widely patent, almost circular when flattened out, instead of quadrate-rotund, very shortly emarginate with the lobes rotundate.

Acolea obtusa (Lindb.).—Mount Shade and Slack of Birnie, Kincardine; Peter's Hill near Birse, rocks above Powlair, and Lochnagar, Aberdeen. *A. concinnata* (Lightf.). —This more alpine species is represented by specimens from Mount Shade, a hill of low elevation (1662 ft.) for the plant; also from Lochnagar.

Saccogyna viticulosa (Mich.).—There are a few stems of this species from Den of Lathers, 1868. It is a very rare plant towards the east coast, though common on the west side of the country.

ZOOLOGICAL NOTES.

Harp Seal in the Tay.—The note on this species in the last number of the "Annals" (p. 117) leads me to remark that the Harp Seal (*Phoca grænlandica*) has been observed on more than one occasion in the Tay. A handsome male of about five years

was captured in Invergowrie Bay, Tay, on the 6th of September 1895. It is now in the Museum of the Perthshire Society of Natural Science, and was duly recorded in the "Proceedings" of the Society. A member of the Tay Salmon Syndicate saw one in the autumn of last year, but was unable to get a shot at it.—ALEXANDER M. RODGER, Perth.

Bird Notes from Southern Shetland.—We had a great storm from the north during the last week of January, and for a few days afterwards I saw a great many Little Auks in Spiggie Bay. On 14th February I started a Woodcock quite near to the house. The cold was then intense, and I am afraid that it will prove very bad for the Grouse in Shetland. I saw a King Eider in March; I have never seen this bird before, but I am certain as to its identity. The Black-headed Gulls and Oystercatchers returned from their winter quarters at the end of March, and I saw a pair of Chaffinches on the 29th of that month. On the 13th of April I saw the first Wheatear and Wagtail; on the 14th there were many Redbreasts all over the district; on the 15th a few Redwings and many Fieldfares. A Hedge Sparrow appeared on 17th April. I saw a Kestrel on the wall near the house on the 20th; it is strange that we see one or two about this date and during May, but at no other time.—THOMAS HENDERSON, Jun., Dunrossness.

Snow Bunting in Argyllshire in Summer.—When sheltering under the lee side of the summit of Ben Cruachan (alt. 3689 feet) from the strong breeze blowing on 1st July last, a brilliant pied bird, accompanied by one much duller in colour, came across the ridge, and hovered around for a short time. It was the first time I had seen the Snow Bunting (*Plectrophenax nivalis*) in summer, and the distinct black and white plumage of the male was very conspicuous. The birds returned to the north-east face of the hill, and appeared to settle down amongst the rocks and stones. I heard the song, rising through the breeze, but had to leave without being able to trace the birds further.—HUGH BOYD WATT, Glasgow.

Fulmar, Rough-legged Buzzard, and Stock-Dove in Ayrshire.—Mr. Charles Berry of Lendalfoot informs me that in July 1900 he saw a Fulmar (*Fulmarus glacialis*) on two or three separate days, in his neighbourhood, flying about with a few gulls; and about a week thereafter he found one dead on the shore, possibly the same individual. This is an addition to the British Association Handbook list of Clyde birds. My friend Captain Walter Baxter, of the Anchor Line s.s. *Columbia*, having informed me that Alec Robson, the Marquis of Ailsa's keeper, had in his possession a Rough-legged Buzzard (*Buteo lagopus*), trapped on Mochrum Hill, Maybole, about 1898, I called on Robson in May last year, and had the pleasure of seeing the bird. Another shot at a later date,

but badly damaged by falling on a rock, was not preserved. In May this year, my friend Robert Wilson found a nest of the Stock-Dove (*Columba œnas*) on the Changue Burn, near Darvel. None of the species above named is included in Gray and Anderson's "Birds of Ayrshire, etc." ("Proc. Nat. Hist. Soc. Glasgow," vol. i.), but it may be mentioned that *Procellaria glacialis* is included in the list of birds of Kilbirnie parish in the New Statistical Account (1840-41).—JOHN PATERSON, Glasgow.

Osprey in the Outer Hebrides.—I have seen an Osprey (*Pandion haliætus*) which was shot in April of this year in the island of Lewis. This is, I believe, the first established record of the species in the Outer Hebrides.—T. E. BUCKLEY, Thurso.

Curious Experience with a Heron.—When I came to Lochmaddy, I was told what I thought was a strange story, viz. that it was possible to stalk the Heron, and when close upon him, by making a noise, to render him so stupid or helpless that he would be unable to take wing, and could be caught by the hand. I was told of several occasions on which this had been done, and, incredulous, resolved to try the experiment. On one occasion I had been at Ushenish, and was returning to Lochskipport in an open boat along with a policeman and several others. Shortly after we turned into the loch one of the crew drew my attention to a Heron standing on the shore, 50 or 60 yards off. I immediately set up a loud shouting, in which all the others who were in the boat joined, and the Heron became stupid, and instead of taking wing, ran backwards and forwards on the shore in a confused manner. I had a retriever with me, and stopped shouting for the purpose of directing her to go for the Heron. The whole crew stopped shouting also, and the Heron took to wing. She had, however, to cross the loch not far from us, and we all resumed shouting and bawling, and suddenly in the midst of the row the Heron collapsed and fell into the sea. The dog retrieved, and the policeman tied its legs and beak and took it ashore, killed it, carried it home, and ate it.—ANDREW M'ELFRISH, Lochmaddy.

[Other experiences of this nature have been related to me, and I once witnessed something similar myself.—J. A. H.-B.]

Pintail in Caithness-shire.—On the 1st of August 1901 an adult female Pintail (*Anas acuta*) was shot near Thurso. It was in full moult, but from its appearance had evidently nested in the vicinity.—T. E. BUCKLEY, Thurso.

Pintail in Perth and in Fife.—During the latter half of April I repeatedly observed a pair of Pintails (*Anas acuta*) on a small loch in the Rannoch district of Perthshire; the birds were still there on the last day on which I passed the loch, 28th April, and were very probably remaining to nest. On 20th May I saw another pair of

Pintails on a loch in Fifeshire; this latter pair may have broken off from the main colony on Loch Leven.—Robert Godfrey, Edinburgh.

Black Terns on the Tay.—Two specimens of the Black Tern (*Hydrochelidon nigra*) were obtained on the Tay near Mugdrum island at the end of September 1901. One of these was acquired for the Perth Museum.—Alexander M. Rodger, Perth.

Tameness of the Iceland Gull in Mull.—I had the unique experience of feeding Iceland Gulls (*Larus leucopterus*) in front of my house on the 2nd of February last. I had put down some food for the Thrushes, Blackbirds, etc., when some Black-headed Gulls espied it. The screechings and scramblings of these birds drew around a number of other Gulls from the bay, and among others two Iceland Gulls came on the scene, and were most confiding, and came within five yards of where I was standing. There are at least four of these Gulls in the bay at the present time, all in immature plumage, and were first noted on the 27th of February. —D. Macdonald, Tobermory.

Black Adder in Kincardineshire.—On 20th May 1900 I had brought to me a living Black Adder which was taken on the moors a little to the north of the village of Auchinblae. It measured about two feet in length, and was black all over, and the darkest one I have ever seen, although not the first of a black colour. These Black Adders are very scarce here. I have only seen two or three.—John Milne, Auchinblae.

Bass on the West Coast of Inverness-shire.—A Bass (*Labrax lupus*), estimated to weigh 1¼ lb., was taken by my friend Mr. Alex. Grant on a small salmon fly while fishing in the tidal water at the mouth of the Arbort River on the 16th of July last. This is a rare fish so far north, and the occurrence is worthy of record. The specimen is now in my possession.—J. A. Harvie-Brown.

Capnia atra, *Morton*, in Inverness-shire.—When passing Loch Eunaich on his way up the Cairngorms on 29th March last, after a heavy snowstorm, Mr. H. Raeburn was surprised to see a black fly in countless thousands crawling on the snow by the loch-side; and, knowing my interest in matters entomological, he kindly secured a few specimens for me. On opening the packet I found, as I anticipated, from having previously heard the facts, a species of *Perlidæ*, so I submitted them to Mr. Morton, to whom I am indebted for their identification and much interesting information regarding the species and its allies. He has examples taken at Loch Rannoch in the beginning of April, but the Loch Eunaich insects differ from these in having much shorter wings, a suggestive fact when the stormy nature of the weather they must frequently experience on their emergence from the water in such a wild

locality so early in the year is borne in mind. The loch is 1700 feet above sea-level, and a high wind—a gale, indeed—was sweeping over it at the time of Mr. Raeburn's visit. Phenomena similar to that witnessed by Mr. Raeburn have been recorded, Mr. Morton tells me, in the case of allied species inhabiting the Hudson's Bay country and the Alps.—William Evans, Edinburgh.

Andrena angustior (*Kirby*) **in Scotland.**—I have pleasure in recording, on behalf of Mr. B. M'Gowan, Dumfries, a female of this Bee taken by him at New Abbey, Kirkcudbrightshire, on 3rd June 1900. It is an addition to the Scottish list. I detected the specimen in a local collection of Aculeates which Mr. M'Gowan asked me to name for him a few months ago. Identification confirmed by Mr. Saunders.—William Evans, Edinburgh.

Andrena ruficrus, *Nyl.*, **in Perthshire.**—Referring to my record ("Annals," 1899, p. 158) of the capture of three males of this addition to the list of British Bees at Aberfoyle in April 1896, I have now to record a female taken in the same locality on 7th May of the present year. Mr. Saunders has examined the specimen, and confirms my identification.—William Evans, Edinburgh.

Meta menardi (*Latr.*) **in Midlothian.**—On 6th June I visited the excavations, known as Bruce's cave, under Hawthornden House with the object of looking for this large cavernicolous Spider, and was not disappointed — two adult females being obtained from crevices in the roof. I have already recorded in this magazine the occurrence of the species in "Upper Forth" and other parts of Scotland, but it has not, so far as I know, been previously taken in this district.—William Evans, Edinburgh.

BOTANICAL NOTES AND NEWS.

Scottish Algæ.—In the "Catalogue of the British Marine Algæ," by E. A. L. Batters, F.L.S., now appearing as a Supplement to the "Journal of Botany," the following are recorded from the Scottish coasts:—

Myxophyceæ.—*Glæocapsa crepidinum*, Thur., S. Connel, Argyllshire; *Merismopædia glauca*, Kütz., Cumbrae; *Dermocarpa Schousbœi*, Born., Cumbrae and S. Connel; *D. Leibleiniæ*, Born., Cumbrae; *D. violacea*, Crn., Cumbrae, Oban, and Dunbar; *D. rosea*, Batt., Dunbar; *D. incrustans*, Batt., Arbroath; *Hyella cæspitosa*, Born. and Flah., Cumbrae, Gare Loch, etc.; *Spirulina major*, Kütz., Cumbrae; *S. subsalsa*, Œrsted, S. Scotland; *Oscillatoria Bonnemaisonii*, Crn., S.E. Scotland; *O. margaritifera*, Kütz., Cumbrae; *O. nigroviridis*, Thw., Cumbrae and Berwick; *O. Coral-*

linæ, Gom., Appin; *O. subuliformis*, Thw., Cumbrae; *O. brevis*, Kütz., *β*, *neapolitana*, Gom., Cumbrae; *Phormidium papyraceum*, Gom., Appin and Cumbrae; *P. ambiguum*, Gom., Cumbrae; *P. Ectocarpi*, Gom., Cumbrae; *Lyngbya* (*Leibleinia*) *Agardhii*, Gom., Cumbrae and near Edinburgh; *L.* (*Eulyngbya*) *æstuarii*, Liebm., *f. ferruginea*, Gom., Appin, Cumbrae, Fife, and Aberdeen; *L. majuscula*, Harv., Hunterston, Girvan, Orkney; *L. lutea*, Gom., Cumbrae; *L. Rivulariarum*, Gom., Cumbrae; *Symploca hypnoides*, Ktz., *genuina*, Gom., Dunbar, Earlsferry, and Arran; forma *fasciculata*, Gom., Cumbrae; *Plectonema Nostocorum*, Born., Cumbrae; *P. terebrans*, Born. and Flah., Cumbrae; *Microcoleus chthonoplastes*, Thur., Firth of Clyde, Montrose, Dunbar; *Schizothrix vaginata*, Gom., Cumbrae; *Amphithrix violacea*, Born. and Flah., coast of Scotland; *Calothrix confervicola*, Ag., S. Scotland; *C. scopulorum*, Ag., and *C. pulvinata*, Ag., not uncommon; *C. æruginea*, Thur., Earlsferry in Fife; *C. fasciculata*, Ag., Cumbrae, Lismore, Elie; *C. vivipara*, Harv., Arbroath; *Rivularia Biasolettiana*, Meneg., Cumbrae; *R. nitida*, Ag., Appin, Ballantrae, Eyemouth; *Mastigocoleus testarum*, Lagerh., S. Scotland; *Nostoc entophytum*, Born. and Flah., Cumbrae; *N. Linckia*, Born., Cumbrae; *Anabæna variabilis*, Ktz., Cumbrae; *A. torulosa*, Lagerh., Appin; *Nodularia spumigena*, Mert., *β*, *litorea*, Born. and Flah., Cumbrae.

Chlorospermeæ.—*Chlorochytrium inclusum*, Kjellm., S. Scotland; *C. dermatocolax*, Reinke, Cumbrae; *Characium marinum*, Kjellm., Cumbrae; *Codiolum pusillum*, Foslie, N. Ronaldshay, Orkney; *C. Petrocelidis*, Kuck., Firth of Clyde, etc.; *Prasiola stipitata*, Suhr, Dunoon, Cumbrae, near Edinburgh, and Dunbar; *Pringsheimia scutata*, Rke., Cumbrae and Ardrossan; *Protoderma marinum*, Rke., Cumbrae; *Monostroma Wittrockii*, Born., Tayport; *M. undulatum*, Wittr., Rousay, Orkney; *M. fuscum*, Wittr., Cumbrae and Orkney; var. *Blyttii*, Batt., Tayport and Cumbrae; *M. Grevillei*, Wittr., Bute and Firth of Forth; var. *arctica*, Rosenv., Cromarty; var. *Cornucopiæ*, Batt., Appin and Orkney; *Capsosiphon aureolus*, Gobi, Tayport and Cumbrae; *Percursaria percursa*, Rosenv., S. Scotland and Orkney; *Enteromorpha clathrata*, J. Ag., coast of Scotland; var. *Linkiana*, Batt., Appin and Cumbrae; var. *prostrata* (Le Jol.), Orkney; *E. paradoxa*, Ktz.; var. *tenuissima* (Ktz.), Orkney; var. *erecta*, Batt., S. Scotland and Orkney; *E. torta*, Reinb., Arran, Bute, Appin, etc.; *E. marginata*, J. Ag., Bute and Cumbrae; *E. prolifera*, J. Ag., near Edinburgh; *E. crinita*, J. Ag., near Edinburgh; *E. lingulata*, J. Ag., Orkney; *E. compressa*, Grev., var. *complanata*, J. Ag., Orkney; *E. Linza*, J. Ag., coasts of Scotland, var. *angusta*, Ktz., Cumbrae; *E. intestinalis*, Link, var. *ventricosa* (Le Jol.), Orkney; var. *flagelliformis* (Le Jol.), Orkney; var. *bullosa* (Le Jol.), Orkney; var. *Cornucopiæ*, Ktz., on coast of Scotland; *E. micrococca*, Ktz., var. *tortuosa*, J. Ag., Arran and Cumbrae; *E. usneoides*, J. Ag.,

Cumbrae; *Ulva Lactuca*, L., var. *nana*, Suhr, Arbroath; *Ulothrix implexa*, Ktz., Cumbrae; *U. flacca*, Thur., S. Scotland; *U. speciosa*, Ktz., Appin, Dunbar, and near Aberdeen; *Ochlochæte ferox*, Huber, Cumbrae; *Acrochæta repens*, Pringsh., Cumbrae; *Bolbocoleon piliferum*, Pringsh., Cumbrae and Dunbar; *Blastophysa rhizopus*, Rke., Cumbrae; *Endoderma viride*, Lagerh., Cumbrae and Arran; *E. Wittrockii*, Wille, Arran and Cumbrae; *E. Flustræ*, Batt., S. Scotland; *Tellamia contorta*, Batt., Cumbrae; *T. intricata*, Batt., Cumbrae; *Urospora isogona*, Batt., near Edinburgh, Dunbar, Elie, Arbroath, Montrose, Cumbrae, Oban, etc.; *U. bangioides*, Holm. and Batt., Oban, Port Ballantrae, Bay of Nigg, Montrose Ness; *U. collabens*, Holm. and Batt., Cumbrae; *Chætomorpha tortuosa*, Ktz., from numerous localities; *C. litorea*, Cook, Appin, Arran, Cumbrae, and Orkney; *C. linum*, Ktz., Cumbrae, Oban, Orkney, etc.; *C. ærea*, Ktz., Dunbar, Cumbrae, Arran, Orkney; *C. Melagonium*, Ktz., many localities; *Rhizoclonium Kochianum*, Ktz., Elie and Cumbrae; *R. implexum*, Batt., several localities; *R. arenosum*, Ktz., several localities; *R. riparium*, Harv., common; *Cladophora pellucida*, Ktz., Cumbrae and Orkney; *C. Hutchinsiæ*, Harv., not uncommon; var. *distans*, Ktz., Bute; *C. rectangularis*, Harv., var. *horrida*, Ktz., Arran; *C. Neesiorum*, Ktz., var. *humilis*, Batt., Cumbrae; *C. rupestris*, Ktz., common; *C. utriculosa*, Ktz., Cumbrae and Loch Etive; *C. trichocoma*, Ktz., Cumbrae; *C. gracilis*, Ktz., and *C. sericea*, Ktz., Cumbrae, Ardrossan, Peterhead, and Orkney, etc.; *C. glaucescens*, Harv., Elie, Aberdeen, Orkney, etc.; *C. flexuosa*, Harv., Aberdeen, and near Montrose; *C. refracta*, Aresch., Orkney; *C. albida*, Ktz., and var. *refracta*, Thur., various localities; *C. Balliana*, Harv., Firth of Clyde; *C. Rudolphiana*, Harv., Cumbrae; *C. fracta*, Ktz., var. *marina*, Hauck, common; *C. arcta*, Ktz., not uncommon; var. *vaucheriæformis*, Harv., Dunbar; var. *radians*, Batt., Orkney; var. *centralis*, Harv., Orkney; *C. Traillii*, Batt., Joppa, near Edinburgh; *C. Sonderi*, Ktz., Orkney; *C. arctiuscula*, Ktz., Dunbar, Joppa, Arbroath; *C. stolonifera*, Batt., Cumbrae; *C. pallida*, Batt., Cumbrae; *C. uncialis*, Ktz., Dunbar, Elie, Lismore, Orkney; *C. bombycina*, Batt., Bute and Orkney; *C. lanosa*, Ktz., various localities; var. *Zosteræ* (Dillw.), Forres; *Gomontia polyrhiza*, Born. and Flah., Dunbar and Cumbrae; *Ostreobium Quekettii*, Born. and Flah., Firth of Clyde; *Halicystis ovalis*, Aresch., Firth of Clyde; *Bryopsis hypnoides*, Lamour., Appin, Ayrshire, etc.; *B. plumosa*, Ag., not uncommon; *Derbesia tenuissima*, Crn., Appin; *Vaucheria dichotoma*, Appin; *V. Thuretii*, Woron., Firth of Clyde and Appin; *V. sphærospora*, Nordst., Appin; *f. dioica*, Rosenv., not uncommon; *V. coronata*, Nordst., Arbroath; *V. litorea*, Bang and Ag., Inverness; *Codium tomentosum*, Stackh., Cumbrae, Peterhead, Orkney.

Fucoideæ.—*Desmarestia viridis*, Lamour., not uncommon; *D. aculeata*, Lamour., common; *D. ligulata*, Lamour., Firth of

Clyde, Firth of Forth, Aberdeen, Orkney: var. *angustior*, (Turn.), Orkney; var. *dilatata* (Turn.), Orkney; *Dictyosiphon fœniculaceus*, Grev., various localities; var. *flaccida*, Kjellm., Haddington; *D. hispidus*, Kjellm., Firth of Forth; *D. hippuroides*, Ktz., not uncommon; var. *fragilis*, Kjellm., Orkney; *D. Ekmani*, Aresch., Kinghorn in Fife; *D. Chordaria*, Aresch., Firth of Clyde and Arbroath; *D. mesogloia*, Aresch., Firths of Clyde and Forth, Cromarty, very rare; *Gobia baltica*, Rke., Firth of Clyde and Haddington; *Phœostroma pustulosum*, Kck., Cumbrae; *P. prostratum*, Kck., Cumbrae; *Symphyocarpus strangulans*, Rosenv., Cumbrae; *Litosiphon pusillus*, Harv., various localities; *L. Laminariæ*, Harv., on East Coast and Appin; *L. filiformis*, Batt., Gare Loch and Cumbrae; var. *gracilis*, Batt., Gare Loch; *Phœospora brachiata*, Born., various localities; *Stictyosiphon subarticulatum*, Hauck, Burnmouth, Dunbar, Orkney, Clyde; *S. tortilis*, Rke., several localities, from Borders to Orkney; *Striaria attenuata*, Grev., Clyde, Appin, Orkney; *Phœosaccion Collinsii*, Farlow, S.W. coast and Cumbrae; *Punctaria plantaginea*, Grev., not uncommon; var. *Crouani*, Thur., Cumbrae; var. *rubescens*, Batt., Cumbrae, and Skaill in Orkney; *P. latifolia*, Grev., *genuina*, Batt., Joppa, Peterhead, Arran, Islay, Orkney, not common; var. *laminarioides*, Holm. and Batt., Cumbrae; *P. tenuissima*, Grev., widespread and locally abundant; *P. undulata*, J. Ag., Clyde, Orkney; *Phyllitis zosterifolia*, Rke., Firth of Forth and Ayrshire; *P. Fascia*, Ktz., *genuina*, widespread, but not common; var. *tenuissima*, Batt., Skaill; var. *debilis*, Hauck, Joppa, Arbroath, Cumbrae, Hebrides, rare; *Scytosiphon lomentarius*, J. Ag., common; var. *zostericola*, Thur., Cumbrae and Orkney; *Asperococcus scaber*, Kck., Cumbrae; *A. fistulosus*, Hooker, abundant: *A. bullosus*, Lamour., Clyde, Appin, and Orkney; *A. compressus*, Griff., Orkney; *Streblonema sphæricum*, Thur., Clyde; *S. fasciculatum*, Thur., Clyde; var. *simplex*, Batt., Cumbrae; *S. æquale*, Oltm., Cumbrae; *S. Zanardinii*, Batt., Cumbrae; *S.* ? *helophorus*, Batt., Cumbrae; *Ectocarpus parasiticus*, Sauv., Cumbrae; *E. tomentosioides*, Farlow, Cumbrae; var. *punctiformis*, Batt., Cumbrae, Arbroath, Stonehaven; *E. velutinus*, Ktz., not uncommon; *E. simplex*, Crn., Arran; *E. terminalis*, Ktz., Clyde, Loch Etive, Orkney; *E. globifer*, Ktz., Clyde and Dunbar; var. *rupestris*, Batt., Dunbar; *E. irregularis*, Ktz., Ayrshire; *E. Sandrianus*, Zan., Clyde, very rare; *E. Crouani*, Thur., Cumbrae; *E. confervoides*, Le Jol., abundant; var. *arctus*, Kjellm., Clyde; *E. siliculosus*, Ktz., *typica*, Kjellm., abundant; var. *hiemalis*, Kck., Dunbar; *E. penicillatus*, Ag., Cumbrae; *E. fasciculatus*, Harv., *typica*, not uncommon; var. *congesta* (Crn.), Orkney; var. *Draparnaldioides*, Crn., Orkney; var. *pygmæus*, Batt., Bute.

The British Capreolate Fumitories.—Under this heading Mr. H. W. Pugsley ("Journ. Bot." 1902, April-May) discusses very

fully the forms seen by him from British localities, and compares them with those of the Continent of Europe. He briefly describes and distinguishes the forms recognised by him as British, and (for most) names localities from which he has seen examples. His list is as follows :—

Subsection 1, **Eu-capreolatæ.**

1. *F. capreolata*, L.
   - Subspecies 1, *capreolata* (sensu stricto = *F. pallidiflora*, Jord.)
   - Subspecies 2, *speciosa*, Jord.
2. *F. purpurea*, *n. sp.* (= *F. Borœi*, auct. angl., *non* Jord.).

Subsection 2, **Murales.**

3. *F. muralis*, Sond.
   - Subspecies 1, *muralis* (sensu stricto).
   - Subspecies 2, *Borœi*, Jord.
     - Var. *verna*, Clavaud.
     - Var. nov., *ambigua*.
     - Var. *serotina*, Clavaud (= *F. muralis*, auct. angl., *pro parte*).
     - Var. *muraliformis*, Clavaud (= *F. muralis*, auct. angl., *p.p.*).
4. *F. confusa*, Jord.

Of the forms distinguished as species and subspecies, plate 436 figures flowers and fruiting pedicels and their bracts.

New British Hepatic.—In the "Revue Bryologique" of the present year, pp. 26-32, there is a paper by Dr. W. Arnell with descriptions and figures of three new species of *Kantia* from Sweden. One of them, *Kantia suecica*, Arn. and Pers., found on decaying wood in the province of Herjedalen by Herr J. Persson in 1899, seemed to be similar to a plant which I had found in a similar position in the ravine of Resipol burn, West Inverness, in the same year, and which had been named *K. trichomanis* by an authority. I recently sent a specimen to Dr. Arnell as his *K. suecica*, and he replied that "it appeared to be perfectly identical" with the Swedish plant. In the latter station the plant occurs with *Blepharostoma trichophyllum*, *Cephalozia lunulæfolia*, *Jung. guttulata*, and *J. Helleriana*. The Resipol plant is accompanied with *Ceph. curvifolia*. It is a very slender plant, about the size of *Ceph. lunulæfolia*, and is distinguished from *Kantia trichomanis* not only by its small size, but by its dicœcious inflorescence. Is is also of a paler colour, not glaucous, with cell-walls of leaf somewhat distinctly thickened at the angles, and stipules more deeply incised, with the lobes triangular and rather acute.—Symers M. Macvicar.

British Moss-Flora, by Dr. R. Braithwaite.—Of this important work part xxi. (Vol. III. pp. 129-168, plates cix.-cxiv.), appeared in

April. It describes and figures thirty-five species, two of which are *Hypneæ* and the rest *Stereodonteæ*. As usual, localities of the rarer species are enumerated. It is anticipated that two more parts will complete this standard monograph.

Dicranum strictum, *Schleich.*, in Scotland.—This rare British Moss is not uncommon on trees in Roslin and Hawthornden Woods, Midlothian. I first gathered it there on 30th April 1898, and sent a specimen to Mr. H. N. Dixon, Northampton, who kindly named it for me. The few previously known habitats for it in this country appear to be confined to Staffordshire. Dr. Braithwaite, in whose "British Moss-Flora" (Vol. I.) the Staffordshire plant is erroneously referred to *D. viride* (Sull.), has also seen some of my Roslin specimens.—William Evans, Edinburgh.

CURRENT LITERATURE.

The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—April-June 1902.

[The Editors desire assistance to enable them to make this Section as complete as possible. Contributions on the lines indicated will be most acceptable and will bear the initials of the Contributor. The Editors will have access to the sources of information undermentioned.]

ZOOLOGY.

Capture of a Marten in Ross-shire. John Morley. *Zoologist*, May 1902, p. 192.—A Pine Marten over 30 inches in length trapped on 21st April. The same note is given in *The Field*, 7th June 1902, p. 893.

A Black Hare. D. A. M. *The Field*, 31st May 1902, p. 842. —Refers to a melanic specimen of Lepus variabilis killed near Braemar.

Notes from Aberdeen. W. Wilson. *Zoologist*, May 1902, p. 197.—These refer to eleven species of birds.

Grey Shrike in Scotland in April. E. J. Roy. *The Field*, 7th June 1902, p. 893.—Specimen observed near St. Boswells on 9th April.

Former Haunts of the Osprey in Scotland. D. A. M. *The Field*, 31st May 1902, p. 842.

Additions to "British Conchology." By J. T. Marshall. *Journ. of Conchology*, April 1902, pp. 190-192.—Several Scottish records are given in this paper.

List of Species, Varieties, and Aberrations of Lepidoptera so far only recorded from the British Islands. By J. W.

Tutt, F.E.S. *Ent. Record*, May 1902, pp. 113-118, and June 1902, pp. 147-149.—Several Scottish forms alluded to.

Lepidoptera in Ross-shire in 1901. W. M. Christy. *Entomologist*, May 1902, p. 145.—Twenty-six species captured about the head-waters of the river Carron.

Distribution of Hemaris fuciformis and H. tityus. Various authors. *Ent. Record*, June 1902, pp. 161 and 162.—Scottish localities referred to.

Phlogophora meticulosa, L., in December. A. E. J. Carter. *Ent. Mo. Mag.* May 1902, p. 113.—Refers to a specimen captured on 9th December at Musselburgh.

Notodonta carmelita in South of Scotland. J. C. Haggart. *Entomologist*, June 1902, p. 172.—A female bred from larvæ obtained near Galashiels. The same note also given in *Ent. Record*, June 1902, p. 164.

BOTANY.

The British Capreolate Fumitories. By H. W. Pugsley, B.A. *Journ. Bot.* 1902, pp. 129-136, 173-181, *t.* 436). Discusses the various forms fully, with localities.

Radicula, Hill. By H. and J. Groves. *Journ. Bot.* 1902, p. 200. Points out that by the law of priority *Radicula*, Hill, must supersede *Nasturtium*, R. Br., as a generic name, and gives the British species as *R. officinalis*, H. and J. Groves, *R. pinnata*, Moench (= *N. sylvestre*, Ait.), *R. palustris*, Moench (= *N. terrestre*, Ait.), *R. lancifolia*, Moench (= *N. amphibium*, Ait.).

On the Distribution of Rubi in Great Britain. By the Rev. W. Moyle Rogers, F.L.S. *Journ. Bot.* 1902, pp. 150-157, and p. 201). Contains numerous additions to the county records in the author's "Handbook of British Rubi."

New British Hepaticæ. By Symers M. Macvicar. *Journ. Bot.* 1902, pp. 157-159. Notes *Lepidozia trichoclados*, C. Müll., from Moidart; *Jungermania heterocolpos*, Thed., from Craig-an-Lochain, Killin; *J. atlantica*, Kaalaas, from Dirlot, Caithness; *Marsupella condensata* (Angstr.), on Ben Lawers, at 3200 feet; and *Aneura incurvata* (Lindb.), in Pease Dene, Berwickshire.

A Catalogue of the British Marine Algæ. By E. A. L. Batters, LL.B., B.A., F.L.S. *Journ. Bot.* 1902, March-June; supplement paged separately, eight pages in each part).—Includes Orders *Myxophyceæ*, *Chlorospermeæ*, and *Fucoideæ*, with many localities for the species.

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REPORT ON THE MOVEMENTS AND OCCURRENCE OF BIRDS IN SCOTLAND DURING 1901.

By T. G. Laidlaw, M.B.O.U.

(*Continued from p.* 136.)

Hæmatopus ostralegus (Oyster-catcher).

Shetland—North Unst, March 13. *Orkney*—Noup Head, March 24, two. Sule Skerry, Feb. 27, arrived; May 19, nest with four eggs, never saw more than three before. *Tay*—Pitlochry Feb. 28, returned to breeding ground. *Outer Hebrides*—Flannans, March 14, three. *Argyll and Isles*—Skerryvore, March 7, first this year; May 21, a flock of twelve. Dhuheartach, Sept. 5, flying in the rays with Curlews. Sound of Mull, March 30, four on rock.

Phalaropus hyperboreus (Red-necked Phalarope).

Shetland—Unst, May 26. *Orkney*—N. Ronaldshay, May 29, three. *Forth*—June 9, a pair seen on Forth near Inchkeith ("Annals," 1901, p. 237). *Outer Hebrides*—Island Glass, Oct. 17, struck lantern, picked up dead (leg and wing sent). *Argyll and Isles*—Tiree, June 1, two pairs on loch; July 16, young in down.

Phalaropus fulicarius (Grey Phalarope).

Tay—Montrose, Sept. 9, one shot ("Annals," 1902, p. 54). *Outer Hebrides*—Island Glass, Nov. 3, two, one killed at lantern (leg and wing sent).

Scolopax rusticula (Woodcock).

Shetland—Dunrossness, Sept. 27, one. *Orkney*—Sule Skerry, Jan. 23, one; Feb. 19, one; April 21, one; Oct. 16. *Sutherlana*—Thurso, Feb. 6, a ♂. *Forth*—Isle of May, Oct. 24, two; Dec. 20, several. *Tweed*—West Linton, April 25, one, Baddinsgill. *Outer Hebrides*—Flannans, Nov. 28, Dec. 7 and 22, one each date. Island Glass, Oct. 23, killed on lantern, 2 A.M. (leg and wing sent). *Argyll and Isles*—Dhuheartach, Nov. 14, one killed. *Clyde*—Lamlash L.H., Feb. 13, one; April 19, nest near the station.

Gallinago major (Great Snipe).

Shetland—Dunrossness, Sept. 26, one shot ("Annals," 1902, p. 54). *Orkney*—Stronsay, Sept. 25, two shot ("Annals," 1902, p. 54). *Clyde*—Sept. 17, one shot, Pollok Castle ("Field," Sept. 1901, p. 534). *Solway*—one shot near Castle Douglas during autumn ("Annals," 1902, p. 54).

Gallinago gallinula (Jack Snipe).

Moray—Invergordon, Aug. 26, one shot ("Field," Sept. 7, 1901, p. 432). *Forth*—Aberlady, Oct. 12, three shot. *Outer Hebrides*—Flannans, Nov. 15, four, one killed; 20th, two. Island Glass, Oct. 13, one killed (wing sent). *Argyll and Isles*—Tiree, Oct. 9, have arrived. Skerryvore, Jan. 10, caught at lantern; Nov. 8, one. *Clyde*—Oct. 13, one, Balgray Dam.

Tringa minuta (Little Stint).

Dee—Aberdeen, Sept. 11, one shot. *Forth*—Dunbar, Sept. 11, two.

Tringa subarquata (Curlew Sandpiper).

Shetland—Scousburgh, Sept. 9, one shot in marsh, first seen here. *Dee*—Aberdeen, Sept. 7, six. *Forth*—Dunbar, Sept. 11, thirteen. Dalmeny, Sept. 23, small flock. Aberlady, Sept. 28, one shot.

Tringa striata (Purple Sandpiper).

Forth—Aberlady, Nov. 4, one shot. *West Ross*—Skye, Aug. 16, at Broadford.

Tringa canutus (Knot).

Shetland—Dunrossness, Sept. 30, two shot, Virkie. *Orkney*—Stromness, Aug. 31, two; Sept. 11, eight. *Dee*—Aberdeen, Aug. 31, two killed. *Clyde*—St. Ninian's, Bute, Sept. 11, four. Fairlie, Oct. 11, twenty.

MACHETES PUGNAX (Ruff).

Shetland—Scousburgh, Sept. 19, Reeve shot in Spiggie Marsh. *Sutherland*—Moy, Caithness, Sept. 9, Reeve shot. *Clyde*—Lyoncross and Balgray, Aug. 31 to Oct. 5, several. (Greatest number, eight, Sept. 29.)

CALIDRIS ARENARIA (Sanderling).

Shetland—Dunrossness, Sept. 27, numerous, Virkie Voe. *Orkney*—Stromness, Sept. 2, one shot, only bird seen. *Dee*—Aberdeen, Sept. 11, numerous. *Forth*—Aberlady, Aug. 9, a few.

TOTANUS HYPOLEUCUS (Common Sandpiper).

Moray—Contin, E. Ross, April 11. *Tay*—Pitlochry, April 21, four on Tummel. *Forth*—April 20, Duddingston Loch, and Esk, Penicuik. *Tweed*—Broughton, April 15. Halmyre, April 20, several. *Clyde*—Lamlash, April 13. Dalbeth, April 14. Carmichael, April 20. Balgray Dam, Sept. 27. *Solway*—Dumfries, April 14.

Earliest, April 11, E. Ross.

TOTANUS OCHROPUS (Green Sandpiper).

Outer Hebrides—One obtained in South Uist during autumn. An addition to the fauna of the Outer Hebrides ("Annals," 1902, p. 55). *Tay*—Braco, Aug. 28, one from Braco Castle.

TOTANUS CALIDRIS (Redshank).

Orkney—Sule Skerry, July 8, four; Aug. 23, thirty; Sept. 3, eight. *Tweed*—Broughton, March 11, pair. Cramilt, March 28, pair. Halmyre, April 5, several have arrived. *Argyll and Isles*—Dhuheartach, April 19, one killed at lantern. *Clyde*—Carmichael, March 4, returned.

TOTANUS CANESCENS (Greenshank).

Shetland—Dunrossness, Sept. 30, one shot. *Argyll and Isles*—Tiree, Sept. 7, two. *Clyde*—Aug. 31, one, Balgray Dam.

LIMOSA LAPPONICA (Bar-tailed Godwit).

Dee—Aberdeen, Aug. 30, one shot. *Forth*—Aberlady, July 27, a flock of about twenty. Dalmeny, July 28. *Outer Hebrides*—Barra, May, 1st week, left. *Argyll and Isles*—Tiree, Nov. 11, in small flocks.

NUMENIUS ARQUATA (Curlew).

Shetland—North Unst, April 3, two. *Orkney*—Sule Skerry, April 28, last seen, eight resident during winter; Aug. 8, ten arrived, our winter residents. *Tay*—Auchinblae, April 5, arrived at breeding grounds. *Tweed*—Cramilt, Feb. 11, single bird; 16, several. *Outer Hebrides*—Flannans, May 20, flock; Aug. 8, six. *Argyll and Isles*—Dhuheartach, March 13-14, many flying round light; Sept. 5, flocks flying in rays. *Clyde*—Carmichael, Feb. 12, have returned. *Solway*—Maxwelltown, April 13, flying overhead, N.N.W., 10.25 P.M.; April 22, large numbers passing due north, very dark, 11.30 P.M.; May 4, 9 till 11.5 P.M., heard at intervals overhead going northwards.

NUMENIUS PHÆOPUS (Whimbrel).

Shetland—North Unst, May 19, large number. *Orkney*—Sule Skerry, May 31, a flock of thirteen arrived here on May 3, at first they kept in a flock, but for some days back have been going in pairs; July 26, two; Aug. 23, two; Sept. 10, two. *Forth*—Musselburgh, July 22, one. Elie, July 31, one. Dalmeny Shore, Aug. 24. Aberlady, Sept. 28, two. *West Ross*—Skye, Aug. 16, at Broadford. *Outer Hebrides*—Flannans, May 1, one; 19th, five; 20th, twenty-four; July 28, two. Barra, Eoligary, May 7. *Argyll and Isles*—Tiree, April 25-30, small flocks; May 4, large flock; 14th, very numerous; Aug. 20, a few travelling south. Skerryvore, May 18, on rock all day. Dhuheartach, April 26, many passing at night. *Clyde*—Cardross, Aug. 5.

STERNA CANTIACA (Sandwich Tern).

Forth—May 4, a few near Kinghorn. North Berwick, May 4, getting common; July 28, flock at Fidra point. Dalmeny, Longniddry, and Aberlady, Sept. 28-30, still frequent.

STERNA FLUVIATILIS (Common Tern).

Dee—Aberdeen, May 5, great numbers; Sept. 28, a few. *Tay*—Bell Rock, May 15, five; July 13, very numerous, several young birds. *Forth*—North Berwick, May 4, a few. Aberlady, Sept. 28, a large flock; Oct. 12, a few. *Argyll and Isles*—Skerryvore, May 20, first appearance. Tiree, May 13; several, Gott Bay; Sept. 16, have gone. *Clyde*—Lamlash, May 15, two flying about, do not stay. *Solway*—Portpatrick, Sept. 12, one.

STERNA MACRURA (Arctic Tern).

Orkney—N. Ronaldshay, May 9, one; May 15, numbers. Sule Skerry, May 13, first seen; Sept. 3, last. *Dee*—Aberdeen, May 5,

twenty-four. *Outer Hebrides*—Flannans, June 23, one; June 30, several; July 28, one. Monach, May 21, a few arrived, and increased daily till the 27th. Barra, May 14, arrived. *Argyll and Isles*—Tiree, May 13, several.

STERNA MINUTA (Lesser Tern).

Dee—Aberdeen, May 5, eighteen; Aug. 31, eight seen. *Outer Hebrides*—Barra, nested for first time ("Annals," 1901, p. 237). *Argyll and Isles*—Tiree, May 16, have arrived. Sound of Mull, May 21, two; May 28, four.

LARUS MINUTUS (Little Gull).

Orkney—Noup Head, May 13, two seen, with black heads; March 29-30, a flock of about twenty in Stromness Harbour. E. gale, sleet. *Forth*—North Berwick, Jan. 8, one shot, immature.

LARUS GLAUCUS (Glaucous Gull).

Orkney—Sule Skerry, Jan. 3, one; Jan. 25, three; Feb. 21, a young bird; Oct. 20, one, immature; Nov. 19, one; Nov. 30, adult; Dec. 25-26, over fifty, mostly adult birds, never saw more than four at one time before.

LARUS LEUCOPTERUS (Iceland Gull).

Orkney—Sule Skerry, Nov. 12, one; Dec. 19, one. *Outer Hebrides*—Barra, young Iceland and Glaucous Gulls more numerous this winter than last year.

PAGOPHILA EBURNEA (Ivory Gull).

West Ross—Skye, Feb. 6, about, a fine adult obtained at Broadford ("Annals," 1901, p. 116).

MEGALESTRIS CATARRHACTES (Great Skua).

Shetland—North Unst, April 10; twenty-one nests on Hermaness this year.

STERCORARIUS POMATORHINUS (Pomatorhine Skua).

Orkney—Stromness, Sept. 13, twenty-seven, two shot. *Forth*—North Berwick, Sept. 12, one shot.

STERCORARIUS CREPIDATUS (Arctic Skua).

Shetland—North Unst, April 10. Bell Rock, Aug. 29, two; Oct. 5, two. *Forth*—North Berwick, Sept. 11, very plentiful in

Firth, three shot. *Argyll and Isles*—Tiree, Sept. 17, left. Skerryvore, May 10, attacking Gulls; Nov. 1, one. Dhuheartach, Sept. 25, one.

Alca torda (Razorbill).

Orkney—Noup Head, Feb. 14, numerous; Aug. 6, have left. Sule Skerry, March 23, arrived. *Outer Hebrides*—Flannans, Feb. 28, have arrived, thousands. *Argyll and Isles*—Skerryvore, Nov. 1, two, rarely seen. *Clyde*—Lamlash, Nov. 16, numbers fishing, unusual so late. *Solway*—Portpatrick, Oct. 20, large flocks passing south.

Uria troile (Guillemot).

Orkney—Noup Head, Feb. 14, numerous; Aug. 8, left. *Outer Hebrides*—Flannans, Feb. 28. thousands arrived. *Clyde*—Lamlash, Nov. 16, numbers, unusually late.

Fratercula arctica (Puffin).

Shetland—North Unst, April 16, arrived in force; Aug. 25, left. *Orkney*—Sule Skerry, April 8, first; Aug. 31, last seen. *Forth*—North Berwick, April 22, returned to Craigleith, breeding haunt. *Outer Hebrides*—Flannans, April 18, in great numbers, immediately commenced burrowing; April 22, island literally covered, numbers cannot be estimated.

Mergulus alle (Little Auk).

Shetland—Scousburgh, Jan. 4. *Tay*—Bell Rock, March 19, swimming near rock; Johnshaven, Sept. 17, one. *Forth*—North Berwick, Feb. 4, one shot; Feb. 5 and 28, one picked up each day.

Colymbus glacialis (Great Northern Diver).

Orkney—Hoy, June 7, in Sound. Stromness, Sept. 13, a young bird shot. *Sutherland*—Langwell, June 9, a ♀ in breeding plumage. *Outer Hebrides*—Monach, Nov. 17, three. *Argyll and Isles*—Skerryvore, May 1, one about rock for three days.

Podicipes cristatus (Great Crested Grebe).

Forth—Dalmeny, Oct. 27, in Longgreen Bay. North Berwick, Nov. 3, one. *Clyde*—Newton Mearns, May 17, nesting. *Solway*—Nests regularly on White Loch of Myrton ("Annals," 1901, p. 117).

Podicipes griseigena (Red-necked Grebe).

Shetland—Scousburgh, Nov. 14, one shot on Spiggie.

Podicipes auritus (Sclavonian Grebe).

Solway—On White Loch of Myrton for some days in January ("Annals," 1901, p. 117).

Fulmarus glacialis (Fulmar).

Orkney—Westray, June 8, a number building nests on the rock. *Forth*—Dalmeny, Nov. 13, picked up on shore. *Outer Hebrides*—Flannans, April 7, in numbers; April 21, several.

Puffinus anglorum (Manx Shearwater).

Tay—Bell Rock, June 12, two; Dec. 15, one. *Forth*—North Berwick, Feb. 4, one near Craigleith; Sept. 12, seen in Firth. *Outer Hebrides*—Flannans, March 16, great numbers.

Oceanodroma leucorrhoa (Fork-tailed Petrel).

Orkney—Sule Skerry, Sept. 9, one.

Procellaria pelagica (Storm Petrel).

Shetland—North Unst, June 23, hundreds, midnight. *Orkney*—Noup Head, Sept. 15, on lantern. Sule Skerry, June 1, arrived in large numbers after 10 P.M., Nov. 1, at lantern. *Outer Hebrides*—Flannans, May 4, two killed; July 4 and 20, plentiful; Sept. 16, in numbers. *Argyll and Isles*—Skerryvore, Sept. 13, one caught.

ON THE AVIFAUNA OF THE OUTER HEBRIDES, 1888-1902.

By J. A. Harvie-Brown.

(*Continued from p.* 151.)

[Barn Owl (*Strix flammea*), p. 76.—I think there can be little reasonable doubt in the following description by the late Mr. Agnew: "August 9, 1888—The Owl reported was smaller than a Short-eared one: dark grey on the back: the belly spotted the same as a Short-ear: the breast and throat nearly white, with a few brown spots: *a broad flap down the side of the face like the ears of a dog:* legs yellow and without feathers. He came to the lantern first when I was lighting, and remained till next morning. Mr. Irvine, who has been here four years, had never seen one before."]

Some parts of this above description perhaps may be held as applying better to the Long-eared Owl, but the passage regarding the "flap-like ears down the side of the face" seems to point to it having been a specimen of the Barn Owl.

Long-eared Owl (*Strix otus*), p. 76.—This is an addition to the Fauna of the Outer Hebrides. Colonel Irby records it from North Uist in January 1897: and it is even stated to have nested. The keeper assured him that both the Short-eared and the Long-eared Owls nested there. The fact of there being no trees might seem to militate against this being likely; but then we know that the Kestrel and the Hooded Crow both nest on the ground in North Uist, and that the Long-eared Owl has been known to do so in Sutherlandshire, and that it had bred for some years at Dunvegan in Skye. Our present information, however, is insufficient to allow us to admit it as a nesting species.

I have also heard that this Owl has been seen near Stornoway, and Mr. D. Mackenzie says: "I have not known of the Long-eared Owl breeding in Lewis, but both Long- and Short-eared Owls come in the winter, and go off again with the Woodcock. I would think these (Long-eared Owls!) shot south of the Sound of Harris would have been in winter and early spring."

I hear also of one having been shot in Barra in October 1899, and of another having been seen in October 1900 (*fide* William L. MacGillivray).

Short-eared Owl (*Asio accipitrinus*), p. 76.—In our "Fauna of the Outer Hebrides" we make no mention of this species being found farther south than South Uist, but Dr. M'Rury finds that it breeds in Barra.

Snowy Owl (*Surnia nyctea*), p. 77.—It may be remembered that a specimen of this fine species was shot in Mingulay—the only one remembered on the island ("Fauna of the Outer Hebrides," p. 77, and Appendix D, p. 253). This was in January 1887; and in the same year, and season, one was seen by Dr. M'Rury in Barra —most probably the same bird ("Ann. Scot. Nat. Hist." 1901, p. 115).

Mr. D. Mackenzie informs me that Snowy Owls are still occasionally seen to the north of Stornoway, from time to time, and Mr. Radclyffe Waters tells us that one was shot by one of his party on August 25, 1890; and further, that "In 1893, several appeared during the nesting season and were very destructive, taking the hen grouse at the waterside when they left their nests for their evening drink. The keeper killed several —certainly four or five—and I think Mr. Mackenzie has two of them stuffed." I saw these two birds in Mr. D. Mackenzie's possession in April 1902.

Hen-harrier (*Circus cyaneus*), p. 79.—Dr. M'Rury finds this species breeds through the southern islands, but I fancy they become decidedly scarce anywhere south of Barra, but the species has been recorded as far south as Barra Head ("Ann. Scot. Nat. Hist." 1894, p. 219), at the date of August 17, 1893.

Mr. M'Elfrish of Lochmaddy tells me that these birds are still found in North Uist, "though by no means so plentiful as Robert Grey appears to have found them in Benbecula." Mr. M'Elfrish goes on to say that in summer he can, "by sitting in his garden, watch a pair for hours. They take the small birds that frequent the bushes in the garden. A fine old male pursued a small bird into the garden, and killed it among my potatoes within thirty yards of where I was": and I have other similar accounts.

Buzzard (*Buteo vulgaris*), p. 80.—The Buzzards must still remain in brackets, but Mr. M'Elfrish writes that "When shooting Woodcock on Ben ——, on January 29, 1890, I saw a Buzzard, but whether the Common or a Rough-legged I am unable to say."[1]

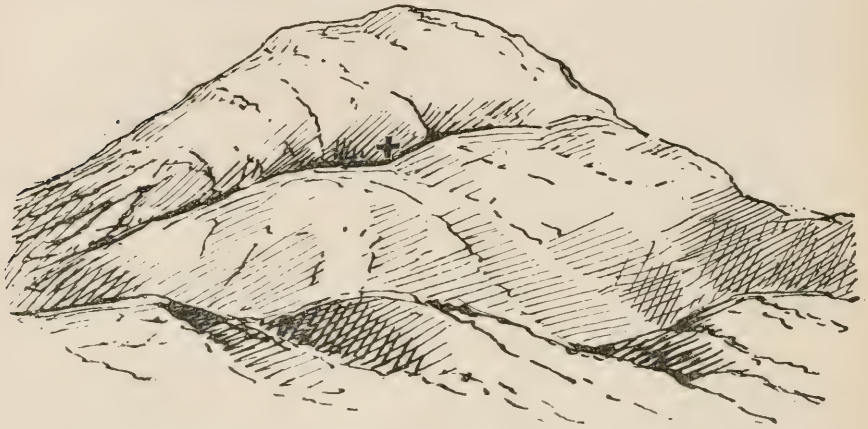
Sea Eagle (*Haliaetus albicilla*), p. 84.—As it is of interest to chronicle anything about the past distribution of our rarer birds, I quote Mr. J. Steele-Elliott, who gathered the information when visiting St. Kilda, that "it is some forty years since this species bred on these islands. It formerly bred and had an eyrie on the Conacher Cliffs, which in height reach some 1260 feet." It may be remembered that somewhat similar information was gleaned as regards its former occupancy of Mingulay. These two localities are within eye-view of one another. The similarity of the dates of their disappearances from both places may have some significance or may not. I quote our previous remarks ("Fauna of the Outer Hebrides," p. 84, 1888). We say: "White-tailed Eagles have long since ceased to occupy the Aonaig Cliff of Mingulay: it is forty years since they bred there, as far as Mr. Finlayson could remember. Sea Eagles, as migrants, used to frequent Mingulay much more numerously at one time." Mr. Steele-Elliott writes in 1895 (seven years later) of the Eagles of St. Kilda, as related above. It will be seen that a space of about seven years, therefore, appears to have existed between the last nesting operations at the two localities—allowing, of course, for slight miscalculations or inaccuracies in the records.

By the lease of the shootings of the Park in Lewis, the tenant, Mr. Platt, is bound to protect the Eagles, and can only kill any by special permission granted upon application to the Chamberlain

[1] These brackets may now be removed, as I have ascertained that one Common Buzzard, which is preserved in Stornoway Castle, was shot there "many years ago by the then keeper—Mr. Brock" (*fide* D. Graham, the present gamekeeper). If so, this is the only Hebridean specimen I know of. I saw the specimen in the Castle in April 1902. It was also stuffed by Mr. Brock.

of The Lews : and all right-thinking sportsmen and naturalists cannot but admire such provision having been made ; and this was done at Mr. Platt's own request. We may rest assured that the Sea Eagles were not molested, and the shepherds have strict orders concerning them.

Sea Eagles are sometimes foolish enough to occupy very simple places. Such appears to have been the case only a few years ago, when a pair occupied a rock-face very easily reached. The consequence was as might be expected—the young birds were taken; but the two men who took them had the impertinence to offer them for sale to the proprietor and the sporting tenant, who do the best they can to preserve Eagles.



SITE OF NEST (+) OF WHITE-TAILED EAGLE, RONEVAL, SOUTH UIST.
(From a Sketch by Mr. Colin M'Vean.)

It will prove satisfactory to lovers of our wild Fauna to be assured that scarcely any diminution has taken place in the number of inhabited eyries since the date of the issue of our volume.

[Sparrow Hawk (*Accipiter nisus*), p. 87. — Although not bracketed in our "Fauna of the Outer Hebrides," I now believe it ought to be. I *suspect* that all records relating to this species as a Hebridean bird may prove of insufficient value, and ought to be bracketed : and this is borne out by many negative statements. Thus, Mr. M'Elfrish writes (November 1901): "During fifteen years I have been here, and with constant observation, I have never seen a Sparrow Hawk in any of the islands."]

Greenland Falcon (*Falco candicans*), p. 87.—The one mentioned by Dr. M'Rury ("Ann. Scot. Nat. Hist." 1894, p. 203) is in the possession of Harvie-Brown at Dunipace, and was given to him by Mrs. MacGillivray.

[Kite (*Milvus regalis*), p. 87.—I cannot assign much importance to a statement regarding a Kite said to have been seen upon Ben Eval, and mentioned in Mr. Alfred Chapman's "Notes," because credit can hardly be given to the truthfulness of his informant, who was well known to Feilden and myself.]

Peregrine Falcon (*Falco peregrinus*), p. 88.—Mr. Andrew M'Elfrish informs me that this fine species is still abundant "in all the Outer Hebrides, and breeds in North Uist." He relates how, upon one occasion (February 9, 1900) he was shooting Woodcock in North Uist, when "my dog flushed a Woodcock too far out for a shot. The bird turned round an angle of cliff and went out of my sight. Immediately afterwards I was surprised by the Woodcock dashing back to me and taking shelter in the heather at my feet, closely pursued by a Peregrine. So keen was the chase that the Falcon nearly escaped striking me."

Mr. Radclyffe Waters considers them quite common in The Lews, and writes me that he saw in one beat of his shooting the remains of no less than five recently-killed grouse, all apparently "the falcons' work."

Merlin (*Falco æsalon*), p. 90.—To the range of the Merlin we can now add the Flannan Isles, as one was sent to be identified from the lighthouse. It occurred upon September 19, 1900 ("Ann. Scot. Nat. Hist." 1901, p. 137).

Osprey (*Pandion haliaetus*), p. 91.—This is an addition to the "Fauna of the Outer Hebrides." The first on record was shot in the spring of 1902 by the keeper of Lewis, and was stuffed by M'Leay of Inverness.

Cormorant (*Phalacrocorax carbo*), p. 91.—A colony, new to our previous information, has been indicated to me (south of the Sound of Harris), but which, it is possible, was occupied before, and may have escaped our notice. It is described as existing "in the face of a cliff on the east side." But upon examination of this locality in 1902, I found it was the same as we had spoken of before in the "Fauna," and is only a resting-locality, and not a nesting-place.

Gannet (*Sula bassana*), p. 94.—The annual movements of the Gannet are now fairly well understood, and many useful details will be found in the earlier Migration Reports, where it is clearly shown that there is an E. to W. trend in the flights of Gannets past Cape Wrath and past The Lews up to the date of about mid-summer; and then there is a pause during part of June. In part of June there is little genuine migration; and Gannets may be found scattered more or less over the western seas wherever there is sufficient inducements of food-supply. Where they most do congregate is around the ever-shifting herring-shoals. Still the main

stream of the birds do not return through the Pentland Firth till July comes in, and then, as fully recorded in our Migration Reports, they pass from W. to E. in continuous battalions; and not one, unless fishing at the time, is ever seen to fly from E. to W. after this real movement fairly sets in again. The observations made at Cape Wrath and at Butt of Lewis are most excellent and useful in this connection. No doubt other currents, so to speak, of Gannets set upon our west coasts from Sulisgeir, and from the Faroe colonies, joining in with the others already mentioned, unless indeed a few fly so far to the west as Rockall, where we found only a very few in the month of June 1896. I have never heard that Rockall was a herring-bank, and have only heard it spoken of as a cod-bank fishery. The few Gannets which we found there were probably dependent for food upon the young of other species than herring.

Night Heron (*Nycticorax griseus*), p. 96.—The single occurrence of this bird in the Outer Hebrides was recorded by Mr. Eagle Clarke in the "Ann. Scot. Nat. Hist." Since then I have a letter from the gentleman who shot it. He says: "I secured a specimen of this rare visitor in Benbecula on October 12, 1896, after a gale from the south. It was an immature male."

Bittern (*Botaurus stellaris*), p. 96.—This is an addition to the Birds of the Outer Hebrides. A specimen of this species was caught upon the coast of Harris by Mr. J. Finlayson, gamekeeper, and sent for in the flesh, and was added to the Dunipace collection in January 1890.

Spoonbill (*Platalea leucorodia*), p. 96. — Remove square brackets. The records, rather incomplete, referred to in the "Fauna of the Outer Hebrides," have had a good light thrown upon them by the discovery of a copy of MacGillivray's "British Birds" which belonged to the late Dr. Charles Gordon of South Uist, and in which occurs an interesting note in pencil on the margin, which I reproduce: "Dr. W. MacGillivray, half-brother of the author, showed me a skin of a Spoonbill which he related had been shot by himself on the farm of Ormaclete, South Uist. Two other specimens were also got in Barra at the same time"—signed "C. G." I have never been able, however, to ascertain where any of these specimens were placed, if indeed they were ever preserved.

Greylag Goose (*Anser cinereus*), p. 97.—I have no definite information which will guide me in arriving at any exact estimation of the numbers of this species now, as compared with its numbers at the time that Buckley and I wrote our "Fauna," but I believe their numbers have not seriously decreased, at least in North Uist, owing

to the very fair attention given there to their preservation. They were abundant as a nesting species previous to 1888, and by the Diary of the late Mr. Alfred Chapman it is evident that his experiences were the same; and he gives one curious instance of this bird breeding at an elevation of some 700 feet above sea-level, on the summit of Ben Lee in North Uist, when the bird was shot off the nest, which contained 6 eggs, "*all rotten.*" The half-tame flock which I used to be acquainted with at Rodel in Harris has almost totally disappeared.

White-fronted Goose (*Anser albifrons*), p. 99.—Six are recorded from Barra as having been seen on April 6, 1893. My correspondent who has sent such interesting notes about Terns, Swans, Phalaropes, etc., tells me the following: "Another interesting bird stopped all last summer (1900) and autumn, viz. a White-fronted Goose, and made company with domestic geese at a farm." Mr. M'Elfrish shot one at Newton on October 8, 1894, and Dr. A. C. Henderson one on Kirkibost on December 11, 1901. A White-fronted Goose was shot between the 6th and the 22nd June in the end of 1895 in Barra, and is an addition to the Fauna of that group of islands ("Ann. Scot. Nat. Hist." 1895, p. 252), *i.e.* the Southern isles. I find that we have omitted from our previous account the occurrence of a specimen of this goose shot in St. Kilda ("Zool." 1895, p. 348; *vide* Harting, "Handbook," 1901, p. 236; see also "Ann. Scot. Nat. Hist." 1896, p. 143). Later, Dr. M'Rury writes me (November 1901): "The White-fronted Goose now, it seems, visits South Uist regularly in considerable numbers, and a few were shot in Barra when I was there—one by myself."

It might be well if particular attention was given in future by those having abundant opportunities of seeing and shooting Geese: it is possible that two forms of White-fronted Goose occur in the Western Isles, and on many of the Inner islands. I would refer my readers and correspondents to an article on the subject in the "Ibis," 1902, pp. 269-275; and also to another in the "Zoologist," September 1902, pp. 337-351, by F. Coburn.

Brent Goose (*Bernicla brenta*), p. 99.—About 20 frequent the Big Strand of Barra at Eoligary. The somewhat general scarcity of the Brent in the Outer Hebrides may in part be accounted for by the rarity of its favourite food, viz. the *Zostera marina*. Mr. Norman Heathcote records a Brent as once seen in St. Kilda.

Bernacle Goose (*Bernicla leucopsis*), p. 99.—Mr. C. V. A. Peel makes the remark that individuals of this species vary greatly in weight. Two shot by him, "right and left," weighed $5\frac{3}{4}$ lbs. and $3\frac{1}{2}$ lbs. respectively." In our "Fauna of the Outer Hebrides" are recorded the facts about the migration of the Bernacle Goose at and around Scolpig in South Uist. I now find this

statement applied to the Greylag Goose on migration by Mr. C. V. A. Peel, upon the authority of the present factor for Sir Arthur C. Orde, Mr. Mackenzie. This may be so, but when we know that the Greylag Goose breeds commonly within the area of the Outer Hebrides, and in other parts of the mainland, and that the Bernacle does not, I think that it is possible that these notes ought only to be held as applicable to the species which is known to migrate beyond, because the marshalling of the young birds of the year is more likely to necessitate the care of the older birds when the species has a much longer flight to take between the winter and the summer quarters. The Greylags are natives, in great part, of the British Isles, but the Bernacles are only visitants. The Greylags' distribution in Great Britain as a nesting species is continuous with its nesting distribution in Scandinavia, and North Europe west of the White Sea. But the nesting area of the Bernacle Goose is "utterly beyond" in comparison; and the latter species has no "finger-posts," so to speak, on the course of their annual migrations. The young, therefore, are more likely to require first guidance.

Mr. Abel Chapman sends me the note, under date of October 2, 1900: "Observed the first Bernacles, a V-shaped skein, going N. to S.

Wild Swans (*C. musicus* and *C. bewickii*, etc.), pp. 101, 102.—Although I have no account of Wild Swans nesting in Scotland to chronicle, yet it is not uninteresting to tell what a vast increase of both species has taken place since our earlier volumes appeared. There can, I believe, be very little doubt that this great increase has been due to the strict preservation which has for all these years been accorded to them in the island of Tiree by the late Duke of Argyll; and it is earnestly to be hoped, in the interests of the birds, that the present Duke will continue to them the same benign rule, or, in the event of that island passing into any other proprietors' hands, that whoever purchases it will continue the clause in all leases to shooting tenants of Tiree which provides for the Swans an absolutely perfect sanctuary, and nothing less. At one time Tiree did not hold anything like as many as it now does; and Wild Swans were really more abundant in South Uist than anywhere else, and far more so than in Tiree or any of the other Outer or Inner Hebrides. A falling-off in numbers, however, took place at their favourite resting-place—Loch Bee—and it may be that the superior advantages supplied by Tiree at that time may have induced this very effect, and added to the numbers in the latter island at the expense of the former haunt. Wild Swans have of late years been likewise preserved in South Uist.

However that may be, my correspondent writes me as follows: "This last winter, *i.e.* 1900-1901, I counted on several occasions

over 200 Hoopers on one loch, a well-known haunt. Between 80 and 100 was the largest number I had ever seen there on any previous occasion. In 1899 we had a single Black Swan, and eight of what I took to be Bewicks, nearly all summer—rather a rare occurrence." "And," he adds, "of course the Black Swan did not make any company with the white ones."

Of the increase of true Wild Swans there cannot be the slightest doubt, not only at old frequented localities, but also at many new ones. But Mute Swans were introduced to the Outer Hebrides at Rodel in Harris, and at Balelone in North Uist, and have been breeding at these localities for years. This ought to be remembered by all who send in records of "Swans" remaining through all, or very late into, the summer.

Wild Swans very rarely alight in Barra. Two young Mute Swans have been introduced into Barra from North Uist. This was in 1893.

Two adult and one young Bewick Swans were shot in North Uist in February 1896, and are recorded as an addition to the Birds of that island, by the late Sir John Campbell Orde ("Ann. Scot. Nat. Hist." 1896, p. 191).

Mr. C. V. A. Peel, writing to me in November 1901, says that all the Wild Swans he has seen or shot in North Uist and Benbecula were most probably Bewicks. He has seen hundreds, and shot four, all the latter having the Bewick's beak-markings, and none weighing more than 14½ lbs., whereas a Hooper weighs 22 lbs. The keepers are of the opinion that far the greater part of these Outer Hebrides Swans belong to the smaller race, or Bewick's Swan.

My South Uist correspondent sends the information that "a single Bewick's Swan is on a loch close to here, and has been here all the summer (*in lit.* August 22, 1902). There were eight on the loch most of the summer, but they all left. The single bird seems quite tame. Sir Reginald Cathcart and I got within fifty yards of it, so there could be no mistake about its being a Bewick's. Perhaps it may be a disabled bird, as I have never seen it on the wing."

Wild Duck (*Anas boschas*), p. 102.—In November 1901, Mr. M'Elfrish wrote me under this species: "Wild Duck quite common, and breeding regularly. One season I assisted in the shooting of 150 in a fortnight—shooting alternate days—and in some of the islands this could be far exceeded"; but common Wild Duck are distinctly rarer to the north of the Sound of Harris. Nowhere in the *Long Island* is the natural feeding so abundant for them as it is *south* of the *Sound* of Harris.

Mr. M'Elfrish shot a Wild Duck in North Uist on January 13, 1902, and sent me the feet, which are reproduced here

as a vignette. It will be observed that the feet are only partially webbed.

(From a Photo done from the feet mounted by Mr. Kirk, Glasgow.)

Gadwall (*Anas strepera*), p. 103.—Dr. C. Gordon has the marginal note in his copy of MacGillivray's "British Birds," vol. v. p. 63: "This bird has been shot by me frequently in South Uist, where it also breeds in the same places with the Common Mallard."—(?).

From internal evidence, in letters received from Mr. S. W. Hartley, who rented the shootings of North Uist in the winter of 1898-99, the Gadwall appears to have slightly increased in numbers there; and in Benbecula Mr. Guthrie reports them as "much about the same in numbers; while Tufted Ducks and Golden-eyes are on the decrease. But while an apparent dispersal takes place of this species of duck to the Outer Hebrides, their haunts there as yet are very restricted, and so far as observed by Mr. Hartley their visits were confined to one loch in North Uist. A pair were shot by Sir Arthur Campbell Orde in North Uist, November 2, 1892.

During the twelve years that Sir W. Benger Smyth had the

shootings of Benbecula Mr. M'Elfrish and he usually killed several every year. Since sending me his earlier notes on this species of duck, Mr. M'Elfrish informs me that "Gadwalls have appeared on a small loch at Portnalong, called Loch-na-Steilean. They made their appearance there in December; since which time a company of about a score have regularly occupied the loch, and a few have been killed."

Shoveller (*Anas clypeata*), p. 103.—The Shoveller may be added to the Fauna of the Outer Hebrides. The earliest record I have of its occurrence in the Isles is that of two shot in Benbecula by Mr. C. V. A. Peel, in 1890, and one in 1891. Then Mr. M'Elfrish writes me as follows: "Shooting with Sir W. Benger Smythe in Benbecula, November 25, 1898, I shot a female Shoveller out of a small flock of twelve or fourteen." Mr. M'Elfrish believed that this "was the first specimen procured in these islands—so far as I can ascertain," and the only one procured in Benbecula during the twelve years previous to 1900. On the same day he shot two Gadwalls. It is only right, however, to record that Dr. M'Rury, writing to me "from memory," in November 1901, says that he shot one or two in Benbecula "many years ago."

Teal (*Querquedula crecca*), p. 103.—Although Professor Wm. MacGillivray did not meet with the Teal ("British Birds," vol. v. p. 54), yet Dr. C. Gordon has a corrective marginal note in his copy to the effect that "This is incorrect. There are plenty of Teal in South Uist.—C. G." Mr. M'Elfrish says of this species that it is now quite common and breeds every year in North Uist and Benbecula, and, "I have no doubt, in South Uist too." And Mr. M'Elfrish and Mr. C. V. A. Peel designate it as increasing yearly, and as "very abundant in Benbecula," at date of 1901. In The Lews, Mr. Radclyffe Waters' experience in six years' sport, *i.e.* in winter, is that the Teal is the most frequently killed of all the wild fowl of Lewis. And he appears confident of obtaining specimens of eggs thence in 1902, in order to prove that they breed there.

Pintail Duck (*Anas acuta*), p. 104.—The first record for Barra is given by Dr. M'Rury, when two were seen in breeding plumage on May 16, 1895, and remained over a week on the east side of the island ("Ann. Scot. Nat. Hist." 1896, p. 23). The only other positive record I have from Barra since the above is one upon September 4, 1897 ("Ann. Scot. Nat. Hist." 1898, p. 213). These, I think, may be looked upon as the first extension of the species, with the one exception which we give of its occurrence in our previous account, to the southern isles, and the flock seen by a correspondent of the late R. Gray, in North Uist, when one was shot. (See "Fauna of the Outer Hebrides," p. 104.)

By 1900, Pintails are reported as having greatly increased in number in Benbecula on the authority of more than one observer

(*e.g.* Mr. Guthrie, gamekeeper (eighteen years resident), and Dr. M'Rury). Comparatively large flocks are now seen in winter in that island; and, what is even more significant, they remain for weeks. Mr. M'Elfrish considers it a regular winter visitor now, "though not so until recent years." Mr. C. V. A. Peel considers it also as very common in Benbecula in winter, dating 1901.

Of records of these birds anywhere north of the Sound of Harris I have only one, viz. one shot by Mr. Ratclyffe Waters upon Galston Shootings on October 1, 1894. It was accompanied by other three. But information regarding the half-tame Pintails and their progeny at Rodel, Harris, makes it very difficult to assign these to a truly wild origin. Bred in 1902.

In a letter dated August 22, 1902, my able correspondent in South Uist informs me that he had "seen several times a brood of Pintail ducks—six young, with the two old birds—nearly able to fly"; and he adds, "It is the first time I have seen young Pintails. I cannot say where the nest was, but am certain not far away. I saw the young when very small, but not in down."

Wigeon (*Mareca penelope*), p. 104.—As yet I have not a single record of the Wigeon nesting in the Outer Hebrides from north to south. For the present, at least, these islands appear to lie outside the influence of the return of the great migratory flights which appear throughout the group during the winter, and I think such a negative statement is worthy of record. As early as September Mr. Agnew reported Wigeon striking the lantern of the Monach Lighthouse upon the north side when the wind at the time was blowing from the south (*vide* schedule of September 3, 1889).

I have the interesting note from Sir Arthur Campbell Orde, kindly forwarded by Mr. M'Elfrish, that a Wigeon "*flapper*" was shot on North Uist in August 1891. And it is of interest to learn that the Wigeon has been recorded as nesting in Ireland at a still later date (*vide* "Zoologist," 1901, p. 269).

A single male is reported as having been seen at midsummer 1902 on a loch in South Uist by Mr. D. Mackenzie of Mull.

The following dates are useful. Mr. Radclyffe Waters says: "I find the following dates of the killing of Wigeon—the "firsts" of the season. At Galson, in Lewis, August 29, 1890; September 20, 1892; October 11, 1893; September 25, 1894; September 25, 1895. And at Gress, on the other side of the island, October 5, 1897; October 17, 1899.

A White Wigeon has been repeatedly seen associating with a flock of those birds during the winter of 1901-2 near Grogary, South Uist.

Scaup Duck (*F. marila*), p. 105.—For a number of years it remained a doubtful matter as to whether this bird had ever bred in Scotland or not. Jardine and Selby were the first ornithologists to

state that it was seen in Sutherlandshire, and an old bird attended by a young one—supposed to be of the same species—was observed. On one or two other occasions old birds were seen, but on no occasion were they *proved* to have nested, until Mr. Heatly Noble gave a more definite and satisfactory account of finding the nest in that same county at a locality not very far removed—if removed at all?—from the place where Selby reported having seen the old and young upon the previous occasion (*vide* "Ann. Scot. Nat. Hist." October 1899). So far as I am aware, no one has hitherto recorded the nesting of this duck anywhere among the islands of either the Outer Hebrides or the "Inner" group of islands. I can now give an authentic statement of its appearance as a nesting species in one of the Outer Hebrides south of the Sound of Harris. The same correspondent already referred to under "Lesser Tern," and other headings in this paper, tells me as follows: "Scaup Ducks are also not infrequently found, though these were not so common formerly"; and, indeed, he adds the statement, "and they are numerous in ——, and have bred for the last four years—two pairs, to my knowledge, in 1897, 1898, 1899, and three pairs in the past season, *i.e.* 1900." It is also believed that they bred again in 1901, and in June 1902 a young bird still in the down was (as a "*dernier resort*") shot by my correspondent, and was sent in the flesh to me. Considerable care has been expended on the identification of this ten days-old specimen, and I am now perfectly satisfied that it is nothing else.

One had been observed in Barra in February 1892, and another is reported from the same island on November 1, 1897; whilst Mr. C. V. A. Peel records (*in lit.*) that he shot one "this season" (*i.e.* 1901) in Benbecula, and he adds, "seen occasionally in South Uist." He considers it "rare."

Mr. M'Elfrish informs me that he "never saw one in North Uist nor Benbecula, nor between these islands, nor between Grimisay and Balelone." But they are regular visitors to South Uist.

These ducks are still rarer north of the Sound of Harris (as, indeed, *almost every species of duck appears to be*). During the six years that Mr. Radclyffe Waters had the winter shooting of Gress and Garson in The Lews, he only obtained one bird which he shot on the farm of Coll on October 9, 1896.

Since the above was communicated by Mr. M'Elfrish, however, he shot a Scaup, when in company with Major C. Anstruther, on the Mill Loch of Barra on November 16, 1901.

The Pochard (*F. ferina*), p. 105.—This duck is now far from uncommon, and is often seen in Benbecula, South Uist, and elsewhere among the isles, but more to the south of the Sound of Harris than to the north of that waterway.

It may be remembered that Eagle Clarke and I identified Pochards—old and young—in Tiree in 1891; and no doubt they had bred there on previous occasions; and they do so still. Of its increase elsewhere in Scotland it is unnecessary here to speak; it is sufficient merely to refer back to what is generally known by Scottish naturalists, and to what has been recorded since the publication of the different volumes of our Scottish Series, in the "Annals of Scottish Natural History," and in a few other periodicals.

Dr. C. Gordon has the marginal note in his copy of MacGillivray's "British Birds," that they—Pochards—"are constant winter visitors, in small flocks, on the lakes of South Uist."

Two were shot in Barra, early in September 1894, by Mr. Peel, who tells me these two birds were only just able to fly, and "that their beaks were easily broken, showing that they were young birds, and had (probably.—J. A. H.-B.) been bred on the loch, the parents escaping when I fired." I think this may yet come to be accepted as the first instance of the Pochard found nesting in Barra, or, for that part, anywhere in the Outer Hebrides.

Immediately south of the Sound of Harris, however, Mr. M'Elfrish did obtain one a few years ago.

In reply to special inquiry, Mr. J. Finlayson, speaking of the breeding of this duck in South Harris, writes as follows: "As regards Pochards breeding in Harris, they may have been 'escapes' from Lord Dunmore's Wild-fowl introductions, or they might have been the young of them (as the old birds were all pinioned, whilst the young were quite strong on the wing). They could not have been any of the two pairs of Pochards that Lord Dunmore put down. Also, on Loch Osigarry, that same season, there were lots of Pochards all winter." Since the above was written I have heard of one Pochard shot as far to the north as Coll Farm, near Stornoway, by Mr. Radclyffe Waters. (All this shows the abomination of *unrecorded introductions* and *random* acclimatisations.)

Tufted Duck (*Fuligula cristata*), p. 105.—Even as early as 1851, when C. Gordon wrote his marginal notes in the fifth volume of his copy of MacGillivray's "British Birds," he spoke of the Tufted Duck as "common and plentiful in South Uist during winter." I have little additional to relate regarding this species, now so abundant in many parts of Scotland, since the issue of our volume in 1888. Bisshopp of Oban did not find Tufted Ducks at all common until the winter of 1894-95, and before then he had obtained a few from the Outer Hebrides—sent as rarities. Nor do I now find any records of its having nested in any of the islands of the group. The information given in an article by the present writer, upon "The Tufted Duck and its Dispersal in Scotland," at that time brought its history fairly well up-to-date ("Ann. Scot. Nat. Hist." 1896, with a map showing the distribution, pp. 3-22).

A somewhat curious statement, however, is made by my correspondent in South Uist, that "it is less common now than formerly"; and his experience dates back some eighteen years (to date of 1902). This negative account deserves notice in this place, and it appears to be supported by the experiences of Mr. C. V. A. Peel, who mentions it as "seen occasionally in Benbecula," whilst Sir Arthur Campbell Orde tells me he shot nine on February 15, 1897, in North Uist, *mentioning it as uncommon*. Previous to this Mr. M'Elfrish had killed one bird, the first record of its occurrence there.

Golden-eye Duck (*Clangula glaucion*), p. 106.—This is another species of duck which a correspondent describes as less abundant than formerly, *i.e.* in his experience of some eighteen years of one locality.

I have one record only of its occurrence in Barra, viz. on October 11, 1897, Dr. M'Rury being the recorder.

But Mr. Radclyffe Waters tells me that "a few are generally seen in the late autumn. One was killed on October 22, 1892; two on October 6, 1893; these had evidently just arrived, and we had to fire at them to drive them off a loch on which they were just out of shot. One drake, in very good plumage, was killed on October 21, 1893."

On the other hand, Mr. M'Elfrish considers this bird to be a regular winter visitor, frequenting both the fresh and the salt water, and common; and Mr. Abel Chapman found a "bunch" of seven on Loch Scatavagh on October 15, and other single birds on other lochs in 1900.

Eider Duck (*Somateria mollissima*), p. 107.—Mr. C. V. A. Peel, in his account of Sport in the Outer Hebrides, considers the Eider to be less abundant in The Lews than they are in the islands south of the Sound of Harris (p. 7). I think this has always been the case, and in Harris also, unless possibly on outlying islands such as Rona, and the Flannan Isles, and otherwise south-west of Harris.

It is interesting in this connection to know that a very great increase of the species has taken place since Buckley and I wrote upon the Fauna of these isles, and also since we published the "Fauna of Sutherland, Caithness, and West Cromarty" (1887), along the mainland coast of Scotland to the north of Skye. I was somewhat surprised (in 1901) to find the Eider Ducks abundant at many places on the West Ross and West Sutherland coast, where, never in our previous experiences, were they found nesting at all. "The Eider Duck at present, 1902, does not nest on the Minch or east side of The Lews, but does so on the west side, from Loch Roag southwards. The rocks north of Loch Roag are probably too high above sea-level for it to land, and where the land is low it is inhabited by crofters." The above passage within quotation marks is by Mr. D. Mackenzie, and I cordially agree with all he relates.

Velvet Scoter (*Œdemia fusca*), p. 109.—A Velvet Scoter was found dead on the Luscantire shore in South Harris in spring 1896. It was sent to Mr. W. L. MacGillivray by Mr. Wilson, solicitor and factor for South Harris.

As long ago as 1890 I received a letter from Mr. George Stoddart—long-time shepherd at Newton—in which he told me of "Black Ducks with bright orange bills" seen in the western part of the Sound of Harris. I have not to date ascertained whether there has been any increase in the numbers seen now or not, but expect to hear before long. Since the above was penned, Sir Arthur Campbell Orde informs me that seven or eight were seen on January 22, 1892, "near Boreray."[1]

Red-breasted Merganser (*Mergus serrator*), p. 111.—In connection with the remarks in our "Fauna of the Outer Hebrides" on the rare occurrence of this bird in St. Kilda, notice is taken in Mr. Young's note-books. These notes tell me that Mr. Mackenzie, the factor, is most positive that it has never been found breeding there, and only one or two specimens have ever been seen or obtained; and one obtained by a native was looked upon as a great curiosity (Journals of the late Mr. J. Young; and C. Dixon in "Ibis," 1885, p. 87).

Goosander (*Mergus merganser*), p. 110.—It may now be recorded as an addition to the Fauna of the Outer Hebrides. Mr. Radclyffe Waters mentions "a young male, just assuming full plumage, shot on October 26, 1895, while fishing in a burn, and with four or five small trout in its gullet. This was at the end of a week of very bad weather—northerly wind with rain, hail, and snow every day. Apparently the first specimen actually obtained in The Lews or the Outer Hebrides. The bird has been preserved."

Mr. M'Elfrish writes me as follows: "Since I saw your book, for the first time, I have been on the look-out for this bird all the year round, but I have not seen one in these islands. I know the bird quite well, having seen it on the River Forth, and having handled specimens shot by my father." I may add it is extremely unlikely that Goosanders would breed in a treeless land like the Outer Hebrides before the great areas of far more suitable country on the mainland were fully occupied. Mr. C. V. A. Peel considers it "comparatively rare," speaking of it generally.

[Smew (*Mergus albellus*), p. 112.—Though hitherto holding a somewhat precarious position in the Fauna of the Outer Hebrides, on the strength of a single record, I think the following account deserving of being included. Mr. C. V. A. Peel writes: "Mr. C. B. Poulton, my shooting companion, called my attention to two ducks

[1] Boreray of the Sound of Harris; not to be confounded with the island of the same name of the St. Kilda groups.

near the island of Vallay, North Uist. On looking at them on several days with a powerful glass, I made them out, with no hesitation, to be Smews." Mr. Herbert Langton saw a female Smew near Little Bernera of The Lews in May 1899.]

Wood Pigeon (*Columba palumbus*), p. 112.—On April 23, 1900, Mr. M'Elfrish shot a Wood Pigeon "below my garden at Lochmaddy. This one I had stuffed and sent to the collection at Kilmory. On June 4, when cycling up the north side of Blashval, I flushed another. It got up quite close to me, and only flew a short distance into the moor, where it pitched. These are all I have seen in the Long Island."

Turtle Dove (*Columba turtur*), p. 114.—This species has now been added to the Fauna of the group by "our indefatigable correspondent," so often mentioned before as resident observer in Barra for many years—Dr. M'Rury. The date was September 27, 1895 ("Ann. Scot. Nat. Hist." 1896, p. 23), and it is believed to have been reared in the Outer Hebrides as it was not considered strong enough for a long flight.

Another one, a young bird, in North Uist in August 1896, is in the collection of Sir Arthur Orde, Kilmory ("Ann. Scot. Nat. Hist." 1896, p. 255).

Yet another is reported from the Flannan Isles, October 28, 1900 ("Ann. Scot. Nat. Hist." 1901, p. 140).

Mr. W. L. MacGillivray writes me that a young male Turtle Dove appeared at Eoligary on August 18, 1901, "and was caught by one of our servants on September 29." Mr. MacGillivray has had it in a cage since then, and he says "it makes a very interesting pet; is perfectly tame now." He goes on to say, "Another older Turtle Dove appeared here on September 25, and remained with the young bird only for two days, whereafter it took its departure. I have another Turtle Dove, a male, in my collection," continues Mr. MacGillivray, "which I shot in May 1897, and a female appeared same month, but a week later, which left in a few days."

Pheasant (*Phasianus colchicus*), p. 116.—Mr. M'Elfrish informs me that "a few pairs have just been introduced to North Uist by Sir Arthur Campbell Orde at Newton, 1901."

Pallas Sand Grouse (*Syrrhaptes paradoxus*), p. 254.—In continuation of our remarks in the Appendix to the "Fauna of the Outer Hebrides," Mr. Radclyffe Waters is able to record that two or three out of that flock were shot by the keeper. One set up by him is now in the lodge.

Partridge (*Perdix cinerea*), p. 117.—Previous introductions, as we have seen ("Fauna of the Outer Hebrides" p. 117) have not proved successful. Subsequent attempts, as yet, have met with not much better results, as will be gathered from the following notes by Mr.

M'Elfrish: "A few pairs were introduced by Sir Arthur Campbell Orde at Newton a few years ago. For the first year or two they did fairly well, a covey or two having been reared; but latterly these have disappeared. This season a fresh introduction has been made." These remarks apply to North Uist.

Quail (*Coturnix communis*), p. 117.—Dr. M'Rury heard at least four or five different birds in the minister's glebe in Barra in June to September 1893, and he tells us that he failed to flush any of them; but that the Rev. J. W. Macdonald, who had frequently accompanied him in his searches, was more fortunate, and succeeded in raising one on wing ("Ann. Scot. Nat. Hist." 1894, p. 246).

(The Migration Reports announce the unusual numbers of quails in Scotland that year, and the fact of their breeding not uncommonly in Shetland, even in North Unst.)

Ptarmigan (*Lagopus mutus*), p. 118.—That Ptarmigan are rare in the Outer Hebrides there can scarcely be room for doubt, but it seems difficult to gather positive data as to their numbers and as to whether they are really decreasing. Referring to 1866, I have the note that a covey was seen upon the old haunt, viz. Cleisham, in North Harris, on September 2 (*auct.* A. Burn-Murdoch, *in lit.*, December 5, 1901).

And in 1893, as I am informed by Mr. C. V. A. Peel, that gentleman saw three flying round Sobhal, near Uig, Lewis, in September, but he failed to see them again when he went especially to look for them.

From South Harris all information is negative, unless a bird seen upon the Luscantire hills, and reported to Mr. J. Finlayson, gamekeeper in South Harris, was one. It was described as "like a grouse, but white and grey," and his informant adds, "I suppose it was a Ptarmigan from North Harris. There were a few there at that time, viz. about 1890 or 1891."

Mr. D. Mackenzie, writing from Stornoway, says: "The last I have seen was in the Park of Lewis in 1884 or 1885, but I have not been on the higher hills in The Lews since those years. There never were very many of them, but I think it most likely that there are still a few of them thereabout."

But later, I have received the statement from the head gamekeeper and forester in "The Park," that a decided *increase* has taken place there since he came to the place some twenty years ago, and he speaks of at least twelve *pairs* on one hill.

Grouse (*Lagopus scoticus*), p. 118.—In continuation of our previous remarks under this species I have not much to add, except that proprietors and shooting tenants have become much more alive to facts. The proprietor of the Long Island has realised that it has become advisable to introduce fresh blood, and has put down

"some imported Red Grouse this last season (1901) with the object of improving and strengthening the breed." This is an example which ought to be followed by others.

Mr. C. V. A. Peel speaks of it as "on the decrease," and as "larger and redder than those of the mainland."

Water-rail (*Rallus aquaticus*), p. 121.—Since our "Fauna of the Outer Hebrides" was issued, several more records of Water-rails have reached me, and the farthest south records are again from Monach Isles. But its status can scarcely yet be fully valuated. Mr. M'Elfrish sends me the following instructive notes on their occurrences in North Uist: "In my opinion," he says, "it is most decidedly rare. In the past fifteen years I suppose I must have searched almost every likely place in North Uist and Benbecula with setters, pointers, retrievers, and spaniels; and have only found two. The first was in November in Benbecula, in a ditch by the roadside, near Grogary, and the other was on Ben Lee, in North Uist. I also remember Sheriff Webster shooting one about ten years ago, and I understood from him that it was the only one he had seen."

One is recorded by Mr. Radclyffe Waters from Lewis, October 1, 1891.

(*To be continued.*)

NOTES ON THE SCOTTISH ADDER.

By Surgeon-General Bidie, C.I.E.

In the interesting notice in the April number of the "Annals," by Dr. Leighton, on the Serpents of Scotland, he propounds various questions regarding the habits, varieties, etc., of *Vipera berus*, which no doubt will in due course find copious replies now that attention has been directed to these points. Although widely distributed in Scotland, there are various districts in which the Adder is rare or unknown, and this, coupled with its retiring habits and often remote haunts, has prevented much attention being paid to it by naturalists and others. As a matter of fact, the first impulse of the ordinary man on the moor, on seeing a Viper, is to kill and throw it aside, and instead of making notes on it, he congratulates himself on having put a dangerous creature out of the way of doing mischief. As regards the other indigenous snakes of Great Britain, it may be stated with almost absolute con-

fidence that they are never found in Scotland, except as fugitives from captivity. During the earlier years of my life in a hilly part of Banffshire, I never saw a living Adder there, although there was abundance of the sort of cover which seems to attract the creature in other localities. In 1896 I spent the summer months on the western shore of Loch Lomond, near Luss, and in that locality had frequent opportunities of observing the habits and haunts of the Adder, as it is common on the mainland and on at least two of the islands. One of these is Inchlonaig, the deer-park of Sir James Colquhoun of Luss, on which no one, as a rule, is allowed to land except the keeper and his family, who have a house on it. The vegetation of the island consists chiefly of heather, coarse grass, and a few clumps of stunted trees. The keeper's wife told me that in summer Adders can be seen in various parts of the island basking in the sun, and this information was confirmed by some of the Luss boatmen who had been allowed to land on Inchlonaig. The other island in that quarter of Loch Lomond which has an evil repute for Vipers is Inchconnachan, which is covered with tall trees and rank heather. The local population on the mainland have a wholesome dread of the Adders in this locality. In some parts near the shore the Bilberry is common, and on a very bright day I sent a lad (who acted as my boatman) and a girl to collect some of the berries, but they returned in a short time declaring that they were afraid to land, as the serpents were so numerous and menacing. The important question now is, How did the Adders get to these two islands? and to this it will be possible to give, in a very few words, a satisfactory reply. At a part of the loch near the Free Kirk of Luss there is a narrow promontory which runs out in the loch to within a short distance of the island called Inchtavannach, and in the strait between the two I have on two or three occasions seen an Adder swimming towards the island. Once there it could easily pass on to Inchconnachan, as there is only a very narrow strip of water between the two islands. The island of Inchlonaig is more isolated, but not to such an extent as would prevent an Adder reaching it by swimming. It may be mentioned incidentally that while fishing some years ago from a boat in Loch Shin, near Overscaig, an

Adder crossing the loch came quite near the boat. It afterwards passed within a short distance of another boat, and the gentleman in it proposed, by way of a joke, to cast his flies over and catch it, on which the old gillie got very excited, and threatened to jump overboard if the "Serpent" was brought into the boat! I cannot say whether or not the Adder swallows its young when alarmed, but I am able to state that in India a large snake sometimes swallows a smaller one of the same species. On one occasion the writer got together in Madras a collection of Cobras, to be sent to the Zoo in London, but unfortunately they never got there, as it was found impossible to get the captain of any ship persuaded to carry them, although they were secured in such a way as to render escape from the cage in which they were confined impossible. While the Cobras were in confinement near my quarters, the gardeners who looked after them several times told me that a big Cobra was in the habit of swallowing a small one, and that as the latter made itself disagreeable to its captor, it was speedily ejected again and was apparently none the worse of the adventure. This story I refused to believe, until on a Sunday afternoon, when sitting quietly at home, a gardener came and reported that the big Cobra had been at its old trick again, and that if I came quickly I would see the tail of the prisoner protruding out of the mouth of its ravenous neighbour. On reaching the cage the report was found to be correct, and sure enough in due course the smaller Cobra was restored to light and liberty. There is no desire to found any theory on this occurrence, but merely to record the plain facts. In catching a venomous snake, the professional Indian "Snake-charmer" plants the end of a stick on its head, and then instantly seizes its neck close to the head and lifts the snake bodily off the ground. This accomplished, it is usually confined in a small circular basket. If it is to be kept for display or conjuring tricks, the poison-fangs are at once extracted, but as they soon grow again, this operation has to be repeated from time to time. The Canarese gardeners in western Mysore are fond of eating snakes, and they catch them by seizing the tail. This done, the man begins to run swinging the snake round his head with such velocity that it cannot

double back to bite. Meanwhile he makes for the nearest suitable tree or wall, and dashes the head of the snake against it with such force that it is instantly killed.

Pennant, in his tour in Scotland, visited the island of Islay in 1772, and made the following remarks regarding the Adders there: "Vipers swarm in the heath: the natives retain the vulgar error of their stinging with their forked tongues; that a sword on which the poison has fallen will hiss in water like a red-hot iron; and that a poultice of human ordure is an infallible cure for the bite." [1]

IS *RAIA RADULA* OF COUCH, THOMSON, AND YARRELL A GOOD SPECIES?

By George Sim, A.L.S.

Plates IV. and V.

For a good many years back I have been endeavouring to compile a list of the fishes of the east coast of Scotland, and no family has given me more trouble than the Rays. The result has been that extended investigations were necessary, and the outcome of one of these I now beg to lay before the readers of the "Annals." To the form under consideration no fewer than fourteen different names have been given, many of the earlier writers holding it to be a distinct species, while latterly it has been bandied about from variety to species, and back again, until one can scarcely say how the matter at present stands.

As indicated above, Messrs. Couch, Thomson, and Yarrell hold it to be a distinct species; while Drs. Günther and Day, in their respective works, consider *Raia radula* as merely the adult form of *Raia circularis*, the latter author assuming that his *R. circularis* and the Cuckoo and Sandy Rays of Couch are one and the same.

This is the point which I wish to discuss in the present contribution. Before, however, going farther, it is necessary

[1] "A Tour in Scotland and Voyage to the Hebrides, 1772," vol. ii. p. 230.

to point out that *R. circularis* of Day is the Homelyn Ray —Home, Sandy, and Spotted Rays of Yarrell; while it is the Cuckoo Ray of Couch, with the scientific name of *miraletus*. Nor are the figures given of the species to be regarded as more satisfactory. No two of them are alike, nor are they in form like the fish they are intended to represent. Day's figure of *R. circularis* would pass for *R. radula*, but it is in no way like the true *circularis*. Couch's uncoloured figure of *circularis*, which he names the Cuckoo Ray, is good so far as form goes; but the spinulation is not correct. Besides, he describes the figure as being that of a male; if it is so, he has omitted to show the claspers. The coloured figure of his Cuckoo Ray is not the proper shape, as may be seen by comparing it with the uncoloured one at p. 114, vol. i.

Yarrell's figure of *circularis*, which he designates the Homelyn Ray, is, so far as form goes, the most correct of the lot; but he shows nothing of the spinulation on the "wings."

The latter author's figure and description of *R. radula*, as given in his supplement to "British Fishes," published in 1839, p. 19, is merely a reproduction of that given by Couch in the "Magazine of Nat. Hist." New Series, vol. xi., and is intended for a female, but is in outline more nearly that of a male, the anterior edges of the female being rounded instead of being hollowed out as his figure represents it.

Beneath the figure Mr. Yarrell has appended the following names:—

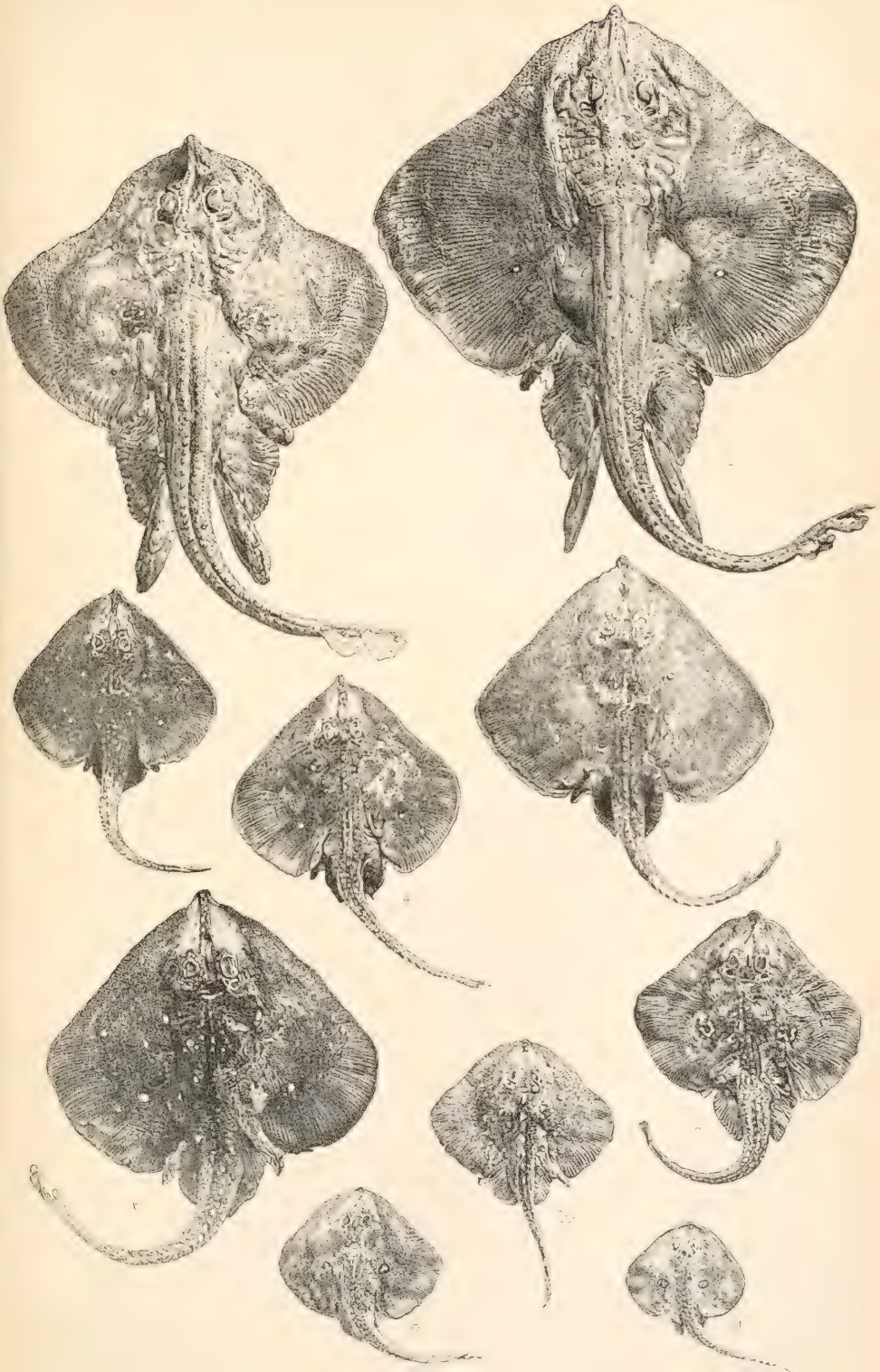
Raia radula, Delar, "Mém. Poiss. Ivic." in "An. Must. Hist. Nat." t. xiii. p. 321.
" " *Raie râpe*, Risso, "Hist." t. iii. p. 151, sp. 38.
" " " *ratissoire*, Blainv., "Faun. Franc." p. 25.
" " *Razza scuffina*, C. L. Bonap, "Faun. Ital." pt. xiii.
" " The Sandy Ray, Couch, "Mag. Nat. Hist." vol. xi. p. 71.

He further remarks: "The close accordance of the figure and description of this fish by Mr. Couch to the figure and descriptions of *Raia radula* of the authors here quoted leaves little room to doubt but that they refer to the same

species, and I include the fish, therefore, as here given, on Mr. Couch's authority."

Is it any wonder, then, after such over-naming has occurred, that error should have crept in? But it does seem strange that those who have written more recently on the Rays should have fallen into error.

As will be seen from the above, Day puts the Cuckoo Ray, and Sandy Ray of Couch as the same species. This he was certainly not warranted in doing, for the following reasons. First, *R. radula* is an abyssal form, while *R. circularis* is not. Second, *radula* attains a much larger size than *circularis*, and before *radula* is mature it is longer and broader than mature *circularis*. What I mean by mature is, that in *radula* the claspers of the male are not developed beyond two inches long when the fish itself has attained a size considerably beyond *circularis*, in which these organs are of full size, and the fish producing young. In confirmation of this I have taken many eggs from *circularis*, and have had them hatched out. Third, in *radula* the male is always much smaller than the female, while in *circularis* the sexes are of the same size. Fourth, the claspers in *radula* differ in form from those of *circularis*, the former having a sharp spine on the edge which the latter never has. Fifth, the teeth of both species, though similar in form, are not identical. Sixth, the form of the two fishes is very different, the anterior edges of *radula* being very much straighter than those of *circularis*, *i.e.* the anterior edges of *circularis* are more hollowed out, and the head is more marked off from the body than in *radula* (see Plate IV.). Seventh, the colour and marking in the two species are different. In *radula* the ground-colour of the dorsal surface is of a light cinnamon brown, with regularly-placed whitish spots upon it; while *circularis* is usually of a yellowish colour, with only the central circular mark on each "wing." In addition to this, it has sometimes white markings similar to those on *radula*, and it is from this fact, perhaps, that some ichthyologists believe it to be merely the young of *radula*, and that the large circular spots disappear with age. This, however, seems to me untenable, for it is mature, and produces its kind while the large marks are still upon it.



Again, these same white markings, similarly arranged, are to be seen as frequently upon *Raia radiata*, a form which no one would think of confounding with either of the species under consideration. Eighth, the proportion of females over males in *radula* is extraordinary. From 7th May 1892 until 5th July 1895 I kept a daily record of all the examples of *radula* that were brought into Aberdeen Market, and within that period 2865 females stood against 123 males; whereas in the case of *circularis*, from 15th August 1894 until 12th July 1895, the numbers were 2237 females and 2381 males, showing an excess of 144 males over females.

Now, the question arises (and has to be answered by those that hold the two forms to be the same), What becomes of the excess of males in what some writers are pleased to call its immature state? It may also be asked, Why is there such a paucity of males when the fish is in what they term its adult state? And further, At what stage of their existence does the change take place, in the form, external colour, and markings of the two forms? If reference is made to Plate IV. there will be seen a series of *Raia radula*, ranging from $7\frac{1}{2}$ inches to 30 inches across its broadest part; and in the case of *Raia circularis*, from 3 inches to its full size of 18 to 22 inches, broader than which I have never seen it. Besides this, *circularis* is quite abundant, and breeds freely in Aberdeen Bay and along the coast both north and south, while *radula* is entirely absent from that ground, and is not to be found until we reach deep water to the north of Wick. Again, if *circularis* is the young of *radula*, how is it that not a single example of it is caught in company with *radula?* One would naturally expect that the immature stage would occasionally be found with the adult.

The nature and distribution of the spines of the two forms differ, *radula* having a few strong irregularly-placed spines upon the nose, and three rows of from seventeen to eighteen spines on each "wing," and the anterior end of these rows does not come nearer the edge of the fin than $1\frac{1}{2}$ inches. On the other hand, *circularis* has no strong spines upon the nose, and those on the "wings" come right up to, and extend along, the anterior edge, the spines becoming

less as they advance towards the front. There are sometimes four rows of these spines, and they form a triangular patch, the long end of which points posteriorly. And lastly, it will be seen on reference to Plate V. that the dorsal spinulation of each form differs widely from the other.

In reference to the spinulation of the Rays, Dr. Günther, in his "Introduction to the Study of Fishes," says: "The males of all are armed with patches of claw-like spines, retractile in grooves of the integument, and serially arranged, occupying a space on the upper side of the pectoral fin near the angle of the disc, and frequently also the sides of the head." These spines are certainly not retractile in the British forms. They are firmly set by broad bases into the skin, and are immovable.

Taking all things into consideration, there seems to be no doubt but that *Raia radula* must stand as a distinct species. This opinion I have held from the first, but refrained from expressing it until such time as a series of each in all their stages could be obtained. This has, within the past two years, come to hand, and I have now an unbroken series of each species, and I consider that I am warranted in saying that no further doubt need exist that the idea of *circularis* being the immature form of *radula* is erroneous.

This, however, is only one of the many tangled points in reference to the Rays, but enough has been said to show that much work yet remains to be done regarding this group of fishes before the subject can be placed on a satisfactory footing.

Explanation of Plates.

Plate IV.

Fig. 1. *R. circularis.* Fig. 2. *R. radula.* Males.
Figs. 3-6. *R. radula.* Figs. 7-9. *R. circularis.* Females. Fig. 10. *R. radiata.*

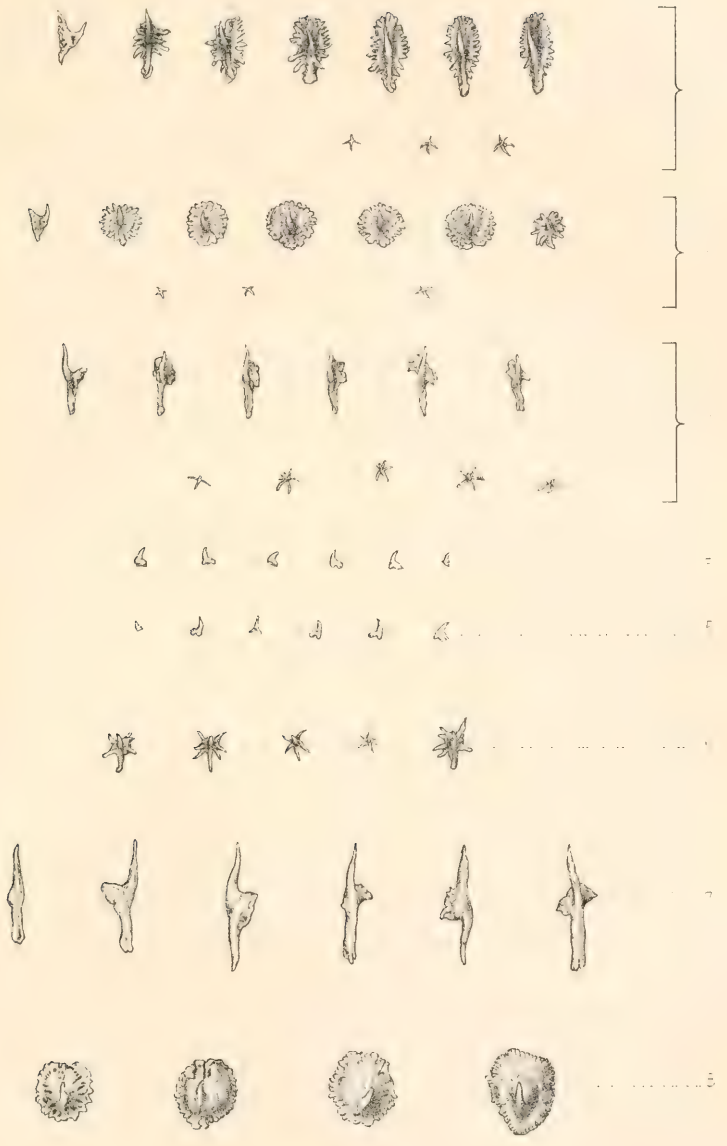
Plate V.

Dorsal Spinulation, etc., of Male *R. circularis.*

1. Large and small spines near eyes.
2. Large and small spines near tail.
3. Large and small spines on wings.
4. Upper teeth.
5. Lower teeth.

Dorsal Spinulation, etc., of Male *R. radula.*

6. Spines near eyes.
7. Spines on wings.
8. Spines on tail.
9. Small spines on tail.
10. Upper teeth.
11. Lower teeth.



SOME NOTES ON THE SCOTTISH CRANGONIDÆ.

By Thomas Scott, F.L.S.

The chief purpose of the following notes is to bring together the various scattered records of the Scottish species of the family Crangonidæ that have been published from time to time.

The best-known species of the family is the common shrimp, *Crangon vulgaris* (Linn.), which the Rev. Mr. Stebbing describes in his felicitous style as being "apparently in the zoological ideas of many persons not only the typical shrimp, the shrimp *par excellence*, but the only shrimp."[1]

At the time of the publication of Professor Bell's "History of the British Stalk-eyed Crustacea," little appears to have been known regarding the distribution of the Crangonidæ in the Scottish seas, for although six species are described by that author, the only direct reference made to Scotland is in connection with *Crangon spinosus* (Leach), where, at page 262, he remarks: "I have a specimen taken by my friends Professor Forbes and Mr. M'Andrew, off Shetland." But since Professor Bell's day many observers have been in the field, and the distribution of the Crangonidæ in the Scottish seas has received much attention, with the result that ten species are now included in the marine fauna of Scotland; they comprise nine species of *Crangon*, together with *Sabinea septemcarinata*.

I will briefly mention in their order a few of the works published subsequent to that of Professor Bell, in which more or less prominence is given to the Scottish Crangonidæ.

1. The Rev. A. M. Norman, "Last Report on Dredging among the Shetland Isles" (published in the Report of the British Association for 1868), records *Crangon vulgaris*, *C. Allmanni*, *C. fasciatus*, *C. trispinosus*, *C. spinosus*, *C. echinulatus*, and *Sabinea septemcarinata*.

2. Prof. MacIntosh, "The Marine Invertebrates and Fishes of St. Andrews," published in 1875, records only *Crangon vulgaris*.

1 "A History of Crustacea," vol. lxxiv. of the International Scientific Series, p. 225.

3. In Smiles' "Life of Thomas Edward," published in 1877, five species of *Crangon* are included in the list of Moray Firth Crustacea, viz.—*C. vulgaris*, *C. spinosus*, *C. sculptus*, *C. trispinosus*, and *C. Allmanni*.

4. "The Invertebrate Fauna of the Firth of Forth," by Leslie and Herdman, published in 1881, contains records of *Crangon vulgaris*, *C. Allmanni*, and *C. nanus*.

5. "The Decapod and Schizopod Crustacea of the Firth of Clyde," by Dr. J. R. Henderson, published in 1886, contains records of *Crangon vulgaris*, *C. spinosus*, *C. sculptus*, *C. nanus*, *C. Allmanni*, *C. echinulatus*.

6. In the "Fourth Annual Report of the Fishery Board for Scotland," Appendix F, No. viii. 1886, is a paper by the Rev. A. M. Norman, containing interesting observations on *Crangon neglectus* and *C. fasciatus*.

Several other papers, including some by myself, published in the Annual Reports of the Fishery Board for Scotland, will be referred to, where necessary.

Dr. Henderson, in his work on the Clyde Crustacea, includes the genus *Nika* in the family Crangonidæ, but Bell, Spence Bate ("Challenger" Macrura), and the Rev. T. R. R. Stebbing, exclude it. Professor Bell places *Nika* in the family Alpheidæ, but the other two authors named make it the type of the family Nikidæ.

The nine species of *Crangon* recorded from Scottish waters are by some writers grouped under four genera, viz.: CRANGON, Fabricius, represented by *Crangon vulgaris* and *Crangon Allmanni*. PONTOPHILUS, Leach, represented by *Crangon spinosus*. CHERAPHILUS, Kinahan, represented by *Crangon trispinosus*, *Crangon echinulatus*, *Crangon neglectus*, and *Crangon nanus*. And EGEON, Risso, to which is assigned *Crangon fasciatus* and *Crangon sculptus*. I propose, however, to treat of them all under the old and more familiar name of *Crangon*; the *Sabinea*, for which there appears to be but the one record, being kept separate.

Remarks on the Species.

CRANGON VULGARIS (*Linn.*).—This is one of the largest as well as the commonest of the Scottish species of *Crangon*. It is a littoral species, and is found all around our shores where the beach is sandy.

The rostrum is moderately broad at the base, but tapers towards the apex, which is rounded. The carapace, or shield, is comparatively smooth, and is furnished in front with three moderately prominent spine-like teeth, one on each side, and one in the middle behind the rostrum; the three teeth are nearly in line, but the middle one is slightly posterior to the others. The remaining segments are smooth and evenly rounded on the dorsal surface, except that in some specimens there is a slight flattening or depression along the middle dorsal aspect of the last segment. The colour is usually a "speckled grey." One of the largest specimens, with ova, in our collection measures 70 millimeters from the point of the rostrum to the extremity of the "tail"; but larger specimens may sometimes be observed.

Crangon Allmanni, *Kinahan*.—This is also a common species, and is perhaps as common and generally distributed as the last, but being confined to deeper water is not as frequently noticed by the casual observer. It has a moderately close resemblance to *C. vulgaris*, but scarcely attains so large a size. The carapace, as in *vulgaris*, is comparatively smooth, and has similar spine-like teeth in front; the remaining segments are also smooth, except that in the last one there is a distinct groove bordered on each side by a prominent ridge which extends the whole length or nearly so of its dorsal aspect. Moreover, the rostrum is not only distinctly narrower, but it is more cylindrical; the specimens are also usually of a brownish colour rather than grey. The largest ova-bearing specimens in our collection range from 55 to 58 millimeters in length from the point of the rostrum to the end of the tail.

Crangon trispinosus (*Hailstone*).—This species resembles in some respects a small *Crangon vulgaris*, especially in the armature of the carapace, or shield, but the colour is somewhat different, and so also is the form of the rostrum. In this species the rostrum is comparatively short and broad, it sides are nearly parallel, and the apex, instead of being rounded, is subtriangular. Moreover, the arrangement of the three spines on the front of the carapace is somewhat different from that usually observed in *Crangon vulgaris*, in which species the middle spine is slightly posterior to those at the sides, while in *C. trispinosus* the two side spines are slightly posterior to the middle one—a difference readily noticed if one looks across the back of the specimen; the same difference is observable between *C. trispinosus* and *C. Allmanni*. The abdominal segments are all comparatively smooth, and evenly rounded on the dorsal aspect, but a shallow groove extends along the middle of the proximal half of the telson, or middle tail-piece. A female with ova taken in Aberdeen Bay measured about 26 millimeters from the extremity of the rostrum to the end of the telson.

I have examined specimens of *C. trispinosus* from the Firth of

Forth, Aberdeen Bay, and the Moray Firth. It is one of the species recorded by Thomas Edward, of Banff, and the Rev. A. M. Norman has recorded it from Shetland, but it has not yet been observed in the Clyde, nor do I know of any record of it from any place on the west of Scotland.

CRANGON FASCIATUS, *Risso.*—In this species the rostrum is comparatively short and broad, with an abruptly truncate apex, in fact the apex, instead of being rounded, is sometimes slightly concave. The carapace bears a single central spine, situated a short distance behind the base of the rostrum: "on either side of the spine and between it and the margin are three slight lobe-like folds. Between this portion of the carapace and its hinder margin is a deeply-cut sulcus, arching forwards at the sides. There are two transverse bands of dark brown, one across the fourth segment of the abdomen and the other across the telson and uropods."[1]

This is apparently a rare species in the Scottish seas. I know of only two localities where it has been obtained; these are—Shetland, where five specimens were obtained by the Rev. A. M. Norman in 1868; and off Musselburgh, Firth of Forth, where two specimens were captured in four to five fathoms.[2] It is a small species; the specimen recorded by Prof. Bell measured six-tenths of an inch (15 mm.) in length, but the Musselburgh specimens measure scarcely more than 10 mm.

CRANGON NEGLECTUS, *G. O. Sars.*—The rostrum in this species, as in the last, is moderately broad, but instead of having the apex abruptly truncate, it is distinctly and evenly rounded. The carapace has a single central spine situated as in *C. fasciatus*, and a "second small tubercle-like spine on the central line behind it"; but the lobe-like folds are wanting, while "the sulcus which in that species defines their lateral regions is much less distinct and deep." This species, like the previous one, has the fourth abdominal segment, and the telson and uropods, adorned with transverse coloured bands, but they are more of a chestnut colour than dark brown.

This small species was first observed in Loch Tarbert (Loch Fyne) in 1886, and afterwards in Largo Bay, Firth of Forth, in eight to nine fathoms, in 1891. One of the Largo Bay specimens in my collection measures about 18 mm. from the apex of the rostrum to the end of the tail. In part iii. of the "Nineteenth Annual Report of the Fishery Board for Scotland," p. 278, I have recorded this species from the Bay of Nigg and the Moray Firth; this was an error, for these specimens were really referable to *Crangon trispinosus*.

CRANGON NANUS, *Kroyer* (= C. BISPINOSUS, *Hailstone*, of Bell's "British Stalk-eyed Crustacea").—In this species the rostrum is

[1] See Norman's paper in the "Fourth Annual Report of the Fishery Board for Scotland," 1886, i. p. 156.

[2] "Ninth Annual Report of the Fishery Board for Scotland," 1891, iii. p. 309.

small and tapers gradually to the narrow but boldly-rounded apex. The carapace is armed with two small spines on the median line, one being situated a short distance from the base of the rostrum, while the other is intermediate between it and the posterior margin. The carapace is also adorned with numerous minute tubercles arranged more or less in longitudinal lines, which look like indistinct ridges, the principal one being in line with the two spines already alluded to. The two median spines are more prominent in some specimens than in others, and appear more distinct when the carapace is viewed from the side; the arrangement of the tubercles is also more conspicuous when the specimen is partially dried.

Crangon nanus appears to be generally distributed round the Scottish coasts. It has been recorded from the Firth of Forth (Leslie and Herdman, and others); off Aberdeen; the Firth of Clyde (Robertson and myself); Shetland Islands (Norman, who describes it as common in 40-50 fathoms 5-8 miles east of Balta; also Whalsey Skerries Haddock Ground, and occasionally elsewhere). Two females (with ova) which I measured did not exceed 11 mm. in length.

Crangon spinosus, *Leach.*—This and the next two species have a spiniferous carapace. The rostrum in *C. spinosus* has a strong spine on each side near its base, so that it has somewhat of a trifid appearance; its apex is bluntly rounded. The carapace is armed with five spiniferous ridges: the central ridge and the one on each side of it usually extend close to the posterior margin, and each is usually provided with three spines; the other two ridges are less complete. The last two segments of the abdomen are flattened along the median dorsal line, the flattened part being bounded on either side by a slightly raised border; a second pair of raised lines are observable on the same segments outside of those already referred to, but these are indistinct unless in partly-dried specimens; the other abdominal segments are very faintly keeled. The telson is flattened or slightly grooved.

Crangon spinosus has been recorded from various Scottish localities. It has not been recorded from the Firth of Forth or St. Andrews Bay, but Sim obtained it off Aberdeen in 1871-72;[1] and it has been taken in the same neighbourhood during the recent investigations on behalf of the Fishery Board for Scotland. It is one of the species recorded for the Moray Firth in Smiles' "Life of Thomas Edward." It is described by Henderson as being "not uncommon in the Clyde," and it is also one of the species recorded by Alex. Patience;[2] while in his Shetland Report Norman describes

[1] "Scottish Naturalist," vol. i. p. 184.

[2] "Millport Mar. Biol. Stat. Communications" (Nov. 1900), p. 30.

it as common. The larger specimens in our collection range from 45 to fully 50 mm. in length from the apex of the rostrum to the extremity of the tail.

Crangon echinulatus, *M. Sars* (=C. serratus, *Norman*[1]). This species was discovered about the same time by M. Sars and Norman, unknown to each other, but Sars' description appears to have been first published.

In this species the rostrum is nearly as in *C. vulgaris*, being moderately narrow, and tapering to the somewhat acute apex. The armature of the carapace resembles that of *C. spinosus*. Five ridges, one central and two on each side, extend nearly the whole length of it, while posteriorly a short ridge terminating in a small tooth at its anterior end occurs on each side of the central ridge. The central ridge is usually armed with three teeth, and the principal ridge on each side of it with five or six, but the other two lateral ridges have usually only two teeth near the proximal end. All these teeth are depressed and directed forwards. The third, fourth, and fifth abdominal segments are keeled along the median dorsal line; the dorsal surface of the sixth is flattened and slightly grooved, and the telson is also slightly grooved at the base.

The species appears to be widely distributed, but the only localities from which it has been recorded are the Shetland Islands and the Hebrides, where it was discovered by the Rev. A. M. Norman; off Skate Island, Loch Fyne, where Dr. Henderson obtained a single specimen; and near the mouth of the Clyde estuary, where it was found moderately frequent by the fishery steamer *Garland*.

A female (with ova) measured 34 mm., and another specimen (without ova) 45 mm. in length.

Crangon sculptus, *Bell*.—This species, which appears to be rare in Scottish waters, I have not seen. The only Scottish records known to me are the following:—(1) two specimens were captured in five fathoms in Lamlash Bay, Firth of Clyde (Norman); (2) a single specimen was dredged in twenty fathoms off Muggie Point, Little Cumbrae (Henderson); and (3) the species is recorded for the Moray Firth in Smiles' "Life of Thomas Edward."

The following brief description of the species is derived from Bell's "British Stalk-eyed Crustacea":—Rostrum short and comparatively broad, and abruptly truncate at the apex. The armature of the carapace resembles that of *C. spinosus*. The abdominal segments have their dorsal surface distinctly sculptured, the raised portions being polished, while the depressions are slightly pubescent. The third, fourth, and fifth segments are distinctly keeled, but the sixth segment and telson are channelled. The rostrum in this species appears to resemble very closely that of *C. fasciatus*.

[1] "British Assoc. Rept. for 1861" (pub. 1862), p. 151.

SABINEA SEPTEMCARINATA, *Sabine*.—One of the principal points of difference between *Sabinea* and *Crangon* is that in the former the second pair of thoracic legs are not chelate but simple. The only known British example of this species was captured in 1861 by the Rev. A. M. Norman sixty miles east of Shetland, at a depth of eighty to ninety fathoms. This is the only species among those enumerated here that has peculiarly arctic distribution; and probably when the seas around the Shetland Islands come to be more thoroughly examined other arctic forms may be obtained.

ON THE OCCURRENCE OF TERRESTRIAL PLANARIANS IN SCOTLAND.

By W. T. CALMAN, D.Sc., University College, Dundee.

ALTHOUGH terrestrial species of planarian worms have long been known to occur in England, and have recently been recorded from many localities in Ireland by Dr. R. F. Scharff, they do not appear to have been observed hitherto in Scotland. I have lately met with a species in the neighbourhood of Kirkmichael, in Perthshire, and I wish to call attention to the probable occurrence of at least one other native species in this country. The land-planarians are particularly interesting from the point of view of geographical distribution, and it is very desirable that the range of our British species should be exactly determined. A full account of all the species will be found in von Graff's great monograph,[1] and short descriptions of the British forms are given by Scharff.[2]

Rhynchodemus terrestris (O. F. Müller). This species was described so long ago as 1774 by the Danish zoologist O. F. Müller, who says of it, "Primo intuitu juniorem Limacem crederes"; and indeed its close resemblance to a small grey slug has no doubt often caused it to be overlooked by collectors. Large specimens may be about an inch in length when extended by about $\frac{1}{16}$ inch in breadth

[1] "Monographie der Turbellarien, II. Tricladida Terricola (Landplanarien)." 1899.

[2] "Irish Naturalist," ix. pp. 215-218, September 1900.

in the middle of the body, which is more or less flattened and narrowed at either end. The upper side is dark grey in colour, the under side whitish. The narrow anterior extremity, which is generally raised from the ground in moving, bears a pair of minute black eyes. The surface of the body is smooth and moist, and a track of slime is left behind as the animal moves. The mouth is on the under side of the body, a little behind the middle of its length, and the minute genital aperture may be discerned some distance further back.

I found this species in July of this year under mossy stones in a little thicket of alders, on the bank of the river Ardle, near Kirkmichael, Perthshire. A prolonged search only resulted in the discovery of three specimens, the largest not more than half an inch in length when alive.

Rh. terrestris has been found in many localities in England, as far north as Westmoreland and Cumberland, and it is widely distributed in Ireland. The range of the species appears to include the greater part of Western Europe, from Denmark to the Balearic Islands.

Rhynchodemus scharffi, v. Graff (?).—A species of land-planarian certainly different from the foregoing was collected by Professor D'Arcy W. Thompson, C.B., in September 1901, near Crinan, Argyleshire. The specimen unfortunately went to pieces before it could be preserved, but from the appearance of the fragments and from the description of the living animal I am disposed to identify it with this species, with which it agreed in its large size (over an inch in length) and its light yellow colour. *Rh. scharffi* has hitherto been found only in hot-houses near Dublin, but Professor v. Graff and Dr. Scharff agree in thinking that it is probably indigenous.

The only other land-planarian known to occur in Britain is *Placocephalus* (or *Bipalium*) *kewensis* (Moseley), a cosmopolitan species which has been introduced into hot-houses in several places in England and Ireland. This species, which may be easily recognised by the flattened semicircular expansion at the anterior end of the body, has not, so far as I know, been found in Scotland. The museum of University College possesses, however, a specimen of a large

Rhynchodemus from the hot-houses of the Edinburgh Botanic Gardens, sent to us some years ago by Dr. W. G. Smith (now of Leeds). In its external characters, and especially in the arrangement of the longitudinal bands of colour on the body, it seems to approach most closely to *Rh. hallezi*, v. Graff, a species known only by two specimens from the Philippine Islands.

SCOTTISH RUBI.

By Prof. James W. H. Trail, A.M., M.D., F.R.S.

(*Continued from p.* 176.)

78. Peebles.

R. idæus.—R.
R. Chamæmorus. "Balfour MS.," "Top. Bot."—R.

79. Selkirk.

R. idæus.—R.
R. radula (*s. strict.*). Near Faldonside, 1893, *Marshall.*—[R].
R. saxatilis. "Farquharson, Catalogue," "Top. Bot."—R.
R. Chamæmorus. "Farquharson, Catalogue," "Top. Bot."—R.

80. Roxburgh.

R. idæus.—R.
R. Rogersii. Ayton to Cairncross, *C. Bailey.*—R.
R. radula. "Add. Rec. 1892."
R. ochrodermis, A. Ley. Lessudden, *Bailey*, 1898.—R.
R. cæsius, L.—R.
R. saxatilis. "Brotherston," "Top. Bot."—R.
R. Chamæmorus. "Duncan MS.," "N.B. Guide," 1837; "Top. Bot."—R.

81. Berwick.

R. idæus.—R.
R. suberectus. "Top. Bot."—[R].
R. plicatus. "*Johnston*," "Top. Bot."—[R].
R. macrophyllus. *Johnston*, "Fl. Berw." 1831; "Top. Bot."—[R].
R. leucostachys, Schlecht. "*Johnston*," "Top. Bot."—(R).
R. mucronatus, Blox. (as *mucronulatus*). "*Johnston*," "Top. Bot."—(R).
R. radula (*s. strict.*). Ayton to Cairncross, *Bailey*, 1900.—R.
R. echinatus (as *rudis*). "Top. Bot."—(R).

R. dumetorum, W. and Nees, *var.* ferox, Weihe. *F. A. Rogers*, 1897.—R.
R. corylifolius. *Johnston*, in "Fl. Berw."; *F. A. Rogers*, 1897.—R.
R. Balfourianus, Blox. *Johnston*, "Top. Bot."—R.
R. cæsius. *Johnston*, in "Fl. Berw."
R. saxatilis. "Top. Bot."—R.
R. Chamæmorus. *Johnston*, in "Fl. Berw."; "Add. Rec. 1886."

82. Haddington.

R. idæus.—R.
R. mucronatus.—(R).

83. Edinburgh.

R. idæus. Salisbury Crags, *Lightfoot*, 1778.—R.
R. affinis. "Top. Bot."
R. latifolius. "*Balfour*," "Top. Bot."—(R).
R. radula. "Top. Bot."—[R].
R. corylifolius. Roslin Woods, etc., *Greville*, in "Fl. Scot." 1824.
R. cæsius. "Haughton," in "Fl. Scot." 1824.
R. saxatilis. "Balfour, Catalogue," "Top. Bot."—R.
R. Chamæmorus. "Fl. Scot." 1824; "Balfour, Catalogue," "Top. Bot."—R.

84. Linlithgow.

R. idæus.—R.
R. latifolius. "Top. Bot."; near Bridge of Cramond, *W. M. R.*—R.
R. villicaulis (*s. lat.*). "Top. Bot."
R. villicaulis (*s. strict.*). Cramond Bridge, 1897, *W. M. R.*—R.
subsp. Selmeri. 1897, *W. M. R.*—R.
R. macrophyllus.
subsp. Schlechtendalii. "Top. Bot."—(R).
R. mucronatus (as *mucronulatus*). "Top. Bot."—R.
R. radula (*s. strict.*). 1900.—R.
subsp. echinatoides. Near Cramond Bridge, 1896, *W. M. R.*—R.
R. corylifolius. 1900.—R.
R. cæsius. Near Cramond Bridge, 1896, *W. M. R.*

85. Fife and Kinross.

R. idæus, var. obtusifolius (as var. *Leesii*), "Add. Rec. 1885"; Dr. Mactier, "Gard. Chron." November 1882, specimen given by him to me.
R. rhamnifolius. "*Syme*," "Top. Bot."—R.
R. nemoralis, var. glabratus (as var. of *macrophyllus*). "Top. Bot."

R. Lindebergii, P. J. Muell.—R.
R. mucronatus (as *mucronulatus*). "Top. Bot."—R.
R. radula (*s. lat.*). "Top. Bot."
R. radula (*s. strict.*).—R.
R. oigocladus, var. Newbouldii (Bab.).—R.
R. cæsius.—R.
R. saxatilis. "Tom Drummond," "Top. Bot."—R.

86. Stirling.

R. idæus. "Add. Rec. 1886."—R.
var. obtusifolius.—R.
R. fissus.—R.
R. suberectus. "Top. Bot."—R.
R. Rogersii. *C. H. Waddell* ("J. Bot." 1899).—R.
R. plicatus.—R.
var. hemistemon.—R.
R. Lindleianus.—R.
R. rhamnifolius. Near Stirling, 1897.—R.
subsp. Bakeri. 1900.—R.
R. nemoralis, *P. J. Muell.*
var. glabratus. Dried specimen seen, 1896, *W. M. R.*—R.
R. Scheutzii. Stirling and Gargunnock in great quantity, 1896, *W. M. R.*
R. villicaulis (*s. lat.*). "*G. E. Hunt*," "Top. Bot."
(*s. strict.*).—R.
subsp. Selmeri. 1896, *W. M. R.*—R.
R. macrophyllus. *G. E. Hunt*, "Top. Bot."—R.
R. hirtifolius, *var.* danicus. 1896, *W. M. R.*—R.
R. mucronatus (as *mucronulatus*). "*G. E. Hunt*," "Top. Bot."—R.
R. melanoxylon. 1901, *W. M. R.*—R.
R. infestus. Castle Hill and Gargunnock, 1896, *W. M. R.*—R.
R. Drejeri. Castle Hill and near King's Park, 1896, *W. M. R.*—R.
R. radula (*s. strict.*). "Stirling and Gargunnock, plentiful," 1896, *W. M. R.*—R.
subsp. echinatoides. Gargunnock, 1896, *W. M. R.*—R.
R. echinatus.—R.
R. serpens (as var. *rivularis*). "Gargunnock Woods, *Kidstone* and *Stirling;* greatly needing confirmation."—[R].
R. dumetorum, var. britannicus. Castle Hill, Stirling, 1896, *W. M. R.*—R.
var. diversifolius. "Castle Walls, Stirling, *Croall*," "Bot. Rec. Club Rep. 1875." In 1895 list, but omitted from "Handbook," as probably having been *britannicus.*
var. tuberculatus, Bab. In 1895 list, but not in list in "Handbook."

R. corylifolius. Castle Hill, Stirling, 1896, *W. M. R.*—R.
var. sublustris. Castle Hill, 1896, *W. M. R.*—R.
var. cyclophyllus (as var. *conjungens*). "Hunt," "Top. Bot." —(R).
R. cæsius. Castle Hill, 1896, *W. M. R.*—R.
R. saxatilis. "Duthie, Catalogue," "Top. Bot."
R. Chamæmorus. "N.B. Guide," 1837; "Hooker, *sp.*"; "Top. Bot."—R.

87. W. Perth and Clackmannan.

R. idæus.—R.
var. asperrimus. Callander Crags, *W. M. R.* 1897.—R.
R. fissus. *F. W. White*, 1884.—R.
R. suberectus. "Top. Bot."—R.
R. Rogersii. Abundant and conspicuous, 1897, *W. M. R.*—R.
R. plicatus. "*Greville*," "Top. Bot."—R.
R. affinis. "Top. Bot." and "Fl. P."—[R].
R. incurvatus. "Loch Earn, 1897," *W. M. R.*—R.
R. Lindleianus. "Clackmannan," "Top. Bot."; near Aberfoyle and Callander, 1896, *W. M. R.*
R. rhamnifolius. Callander Crags, 1896, *W. M. R.*—R.
R. nemoralis. Near Callander, 1896, *W. M. R.*—R.
R. Scheutzii. "Exceedingly common about Callander," 1896, *W. M. R.*—R.
R. pulcherrimus. Loch Vennachar, etc., 1896, *W. M. R.*—R.
R. Lindebergii. Callander Crags, 1896, *W. M. R.*—R.
R. villicaulis (*s. strict.*). "Extraordinarily abundant on Callander Crags," etc., 1896, *W. M. R.*—R.
subsp. Selmeri. 1896, *W. M. R.*—R.
subsp. rhombifolius. Between Vennachar and Callander, 1896, W. M. R.
R. gratus, Focke. 1900.—R.
R. macrophyllus, *subsp.* Schlechtendalii. Between Callander and Lake of Menteith, 1896, *W. M. R.*—[R].
R. hirtifolius, *var.* danicus. Common, 1896, *W. M. R.*—R.
R. pyramidalis. 1900.—R.
R. mucronatus. "Frequent and locally abundant," 1896, *W. M. R.* —R.
R. melanoxylon. Fairly common, 1896, *W. M. R.*—R.
R. infestus. "About Callander," etc., 1896, *W. M. R.*—R.
R. Drejeri. Loch Vennachar, 1896, *W. M. R.*—R.
R. radula (*s. strict.*).—R.
subsp. anglicanus, Rogers. Near Aberfoyle, 1896, *W. M. R.* —R.
subsp. echinatoides. Callander, etc., 1896, *W. M. R.*—R.
subsp. sertiflorus. Callander and Aberfoyle, 1896, *W. M. R.* —R.

["R. humifusus." "Top. Bot." (= *R. pallidus*, W. and N.).]
R. Koehleri.—[R].
subsp. dasyphyllus (as *pallidus*). "Top. Bot."; near Callander, 1896, *W. M. R.*
[R. saxicolus. "Inverarnan, 1845, Babington," "Fl. Perthensis."]
R. dumetorum, *var.* britannicus, Rogers. Near Callander, in plenty, 1896, *W. M. R.*—R.
R. corylifolius. 1896, *W. M. R.*—R.
R. cæsius. Near Callander, 1896, *W. M. R.*—R.
R. saxatilis. "Syme, sp."—R.
R. Chamæmorus. "Ben Cleuch, Graham, 1840," "Fl. P."—R.

88. Mid Perth.

R. idæus.—R.
var. obtusifolius, noted thus (88) in the "Handbook," but apparently for (89), which see.
R. fissus. *F. B. White*, 1884.—R.
R. suberectus. By Loch Tay, *F. B. W.*, 1884.—R.
R. Rogersii. Knock of Crieff, *C. Bailey*, 1894.—R.
R. plicatus. "Top. Bot."—R.
var. hemistemon. *F. B. W.*, 1884.—[R].
R. nitidus. "Near Methven Bog" ("Flora Perth.").—[R].
R. affinis. "Fl. P."—[R].
R. latifolius. "Top. Bot."; "Breadalbane, *Babington*, 1844"; "Fl. P."—R.
R. imbricatus.—[R].
R. carpinifolius. "Fl. P."—[R].
R. incurvatus. "Fl. P."; Loch Earn, 1896, *W. M. R.*—R.
R. Lindleianus. "Fl. P."; "Loch Earn and Loch Tay," *W. M. R.*—R.
R. rhamnifolius. *F. B. W.*, 1884.—(R).
R. Scheutzii. Knock of Crieff, 1896, *W. M. R.*—R.
R. pulcherrimus. 1900.—R.
R. Lindebergii. Near Killin, *Marshall*, 1892.—R.
R. villicaulis (*s. lat.*). *F. B. W.*, 1884.
(*s. strict.*). Glen Lochy, *Marshall* and *Hanbury*, 1891.—R.
subsp. Selmeri. 1897, *W. M. R.*—R.
subsp. rhombifolius.—[R].
R. gratus.—[R].
R. ramosus, Briggs. "Fl. P."—[R].
R. macrophyllus. *F. B. W.*, 1884. Between Killin and Loch Tay, 1896, *W. M. R.*—[R].
subsp. Schlechtendalii.
var. macrophylloides, 1900.—R.
var. amplificatus.—(R).
R. Salteri. "Fl. P."—[R].

R. micans, Gren. and Godr. *F. B. W.*, 1884; no authentic specimen seen by Mr. Rodger from north of Cheshire.—[R].
R. hirtifolius (*s. lat.*) *F. B. White*, 1884.
var. danicus. Loch Earn, etc., 1897, *W. M. R.*—R.
R. pyramidalis. "Fl. P."; Loch Earn and Killin, 1896, *W. M. R.*—R.
R. mucronatus. Loch Earn, 1896, *W. M. R.*—R.
R. melanoxylon. Loch Earn, 1896, *W. M. R.*—R.
R. infestus. Murthly, 1894, *Trail.*—R.
[R. Drejeri. Loch Earn, 1896, *W. M. R.*, but not in "Handbook."]
R. radula (*s. strict.*). Knock of Crieff, 1896, *W. M. R.*—R.
subsp. echinatoides. Between Killin and Loch Tay, 1896, *W. M. R.*—R.
R. echinatus "Fl. P."—(R).
R. Lejeunei, W. and Nees. *F. B. W.*, 1884; not accepted by *W. M. R.*
R. cavatifolius, P. J. Muell. "Fl. P."—[R].
R. rosaceus, W. and Nees. "Fl. P."—(R).
var. hystrix, W. and Nees. *F. B. W.*, 1884.—[R].
R. Koehleri. *F. B. W.*, 1884.—[R].
subsp. dasyphyllus (as *pallidus*, *F. B. W.*, 1884).—(R).
R. dumetorum, *var.* britannicus. Loch Earn and Knock of Crieff, 1896, *W. M. R.*—R.
var. tuberculatus (as *scabrosus*, Muell.). "Fl. P." (R).
var. fasciculatus (as var. of *corylifolius*). "Fl. P."—[R].
R. corylifolius. *F. B. W.*, 1884.—R.
var. sublustris. "Fl. P."—R.
var. cyclophyllus (as var. *conjungens*). "Fl. P."—[R].
R. Balfourianus.—[R].
R. cæsius. "Fl. P." Loch Earn and Killin, 1896.—R.
R. saxatilis. About Loch Rannoch. *Lightfoot*, "Fl. Scot." 1778.—R.
R. Chamæmorus. Mountains about Loch Rannoch. *Lightfoot*, "Fl. Scot." 1778.—R.

89. East Perth.

R. idæus. Laighwood, *M'Ritchie*, in "Old Statistical Account," 1793.
var. obtusifolius. Seggieden, *Drummond-Hay* ("Fl. P.")
R. fissus. "Near Blairgowrie, *A. Sturrock*," ("Fl. P.")—[R].
R. suberectus. *F. B. W.*, 1884.—[R].
R. sulcatus. "Muirton Wood (Sturrock)," "Fl. P."—[R].
R. plicatus. *F. B. W.*, 1884.—[R].
var. hemistemon. *F. B. W.*, 1884.—[R].
R. affinis. *F. B. W.*, 1884.—[R].
R. latifolius. *F. B. W.*, 1884.—(R).
R. imbricatus. "Fl. P."—[R].
R. carpinifolius. "Fl. P."—[R].
R. incurvatus. "Blairgowrie, *Sturrock*," "Fl. P."—(R).

R. Lindleianus. "Fl. P."—R.
R. rhamnifolius. "Blairgowrie, A. Sturrock," "Fl. P."—(R).
R. villicaulis (*s. lat.*). "Fl. P."
villicaulis (*s. strict.*). *M.* and *Hanb.*, "Add. Rec. 1890"; near Blairgowrie, 1892, Marshall.—[R].
subsp. Selmeri. 1896, *W. M. R.*—R.
R. gratus (as var. of *villicaulis*). "Woody Island," "Fl. P."
R. ramosus. "Fl. P."—[R].
R. rusticanus. "Island below Linn of Campsie." "Fl. P."—R.
R. macrophyllus.—[R].
subsp. Schlechtendalii, *var.* amplificatus. "Fl. P."
R. Salteri. "Fl. P."—[R].
R. Colemanni. "Fl. P."—[R].
R. Sprengelii. "Fl. P."—[R].
R. hirtifolius, *var.* danicus.—R.
R. pyramidalis. "Fl. P."—[R].
R. mucronatus. "Rattray, Sturrock," "Fl. P."—R.
R. radula. *F. B. W.*, 1884.—[R].
R. echinatus. "Fl. P."—(R).
R. Babingtonii. "Countlaw, Rattray, A. Sturrock," "Fl. P."—[R].
R. cavatifolius. "Fl. P." (as *var.* of *R. Koehleri*).—[R].
[R. foliosus. "Fl. P." Not accepted by *W. M. R.*]
[R. Lejeunei. "Fl. P." Not accepted by *W. M. R.*]
R. rosaceus. "Fl. P."—(R).
var. hystrix. *F. B. W.*, 1884; "not certainly known from Scotland."—[R].
R. Koehleri, *subsp.* dasyphyllus (as *pallidus*). "Fl. P."—[R].
R. dumetorum, *var.* diversifolius. "Fl. P."—(R).
var. tuberculatus (as *scabrosus*, Muell). "Fl. P."—(R).
var. fasciculatus (as variety of *corylifolius*). "Fl. P."—[R].
R. corylifolius. *F. B. W.*, 1884.—R.
var. sublustris. "Fl. P."—(R).
var. cyclophyllus (as var. *conjungens*), *F. B. W.*, 1884.—(R).
R. Balfourianus. *F. B. W.*, 1884.—(R).
R. cæsius. "Fl. P."
R. saxatilis. Dunkeld and Blair, *Lightfoot*, "Fl. Scot." 1778.—R.
R. Chamæmorus. "Fl. P."—R.
[R. arcticus. "Ben-y-glo, *Richard Cotton*," "Eng. Bot." t. 1585.]

90. Forfar.

R. idæus. "Plentiful. Fruit. . . . occasionally white," *Gardiner* in "Fl. Forf." 1848.—R.
R. fissus. "Top. Bot."—R.
R. suberectus. "Top. Bot."—[R].
R. plicatus.—[R].
R. Lindleianus.—R.

R. radula (*s. strict.*).—R.
R. corylifolius. *Gardiner*, in "Fl. Forf."—R.
R. saxatilis. "N.B. Guide," 1837; "Top. Bot."—R.
R. Chamæmorus. "N.B. Guide," 1837; "Top. Bot."—R.

91. Kincardine.

R. idæus.—R.
R. fissus.—R.
R. Rogersii. 1900.—R.
R. plicatus. *Trail*, 1884.—R.
R. rusticanus (as *discolor*). "Top. Bot."—R.
R. mucronatus (as *mucronulatus*). "Top. Bot."—R.
R. radula. *Trail*, 1884.—[R].
R. rosaceus, *subsp.* Purchasianus.—[R].
R. corylifolius. *Trail*, 1884.—R.
var. sublustris. *Trail*, 1884.—(R).
var. cyclophyllus.—(R).
R. cæsius. Near Banchory Ternan, *Sim*, 1884.—R.
R. saxatilis. "Syme, Cat.," "Top. Bot."—R.
R. Chamæmorus. "Fl. Abred." 1838; "Top. Bot."—R.

92. S. Aberdeen.

R. idæus. "Fl. Abred." 1838.—R.
var. asperrimus. Occasionally found, *Trail.*
R. fissus.—[R].
R. suberectus. "Bot. Guide," 1860; *Trail*, 1884.—[R].
R. plicatus. *Trail*, 1884.—R.
var. hemistemon. "Top. Bot."
R. latifolius. Near Aberdeen, 1901, *Trail.*—(R).
R. rhamnifolius, *Trail*, 1884.—(R).
R. thyrsoideus. *Trail*, 1884.—[R].
R. macrophyllus. "By River Don at Aberdeen," "Brit. Rubi," "Top. Bot."—[R].
R. mucronatus (as *mucronulatus*). "Top. Bot." New Machar and Fintray, 1901, *Trail.*—R.
R. radula, *subsp.* echinatoides. Bank of Dee at Cults, 1900, *Trail.*—R.
R. rosaceus, *subsp.* Purchasianus (as *R. glandulosus*, var. *Reuteri*). "Top. Bot."—[R].
R. corylifolius. "Fl. Abred." 1838.—R.
var. sublustris. *Trail*, 1884.—(R).
var. cyclophyllus.—(R).
R. saxatilis. *David Skene*, MS., about 1765; "Fl. Abred." 1838; "Dickie, Cat.," "Top. Bot."—R.
R. Chamæmorus. *D. Skene*, MS., about 1865; "Dickie, MS.," "Top. Bot."—R.

93. N. Aberdeen.

R. idæus.—R.
var. obtusifolius. Tarves and Longside, both in 1901, *Trail.*—R.
var. asperrimus. Occasionally found, 1900, *Trail.*
R. carpinifolius. Near Mormond House, 1900, *Trail.*—(R).
R. villicaulis (*s. strict.*). Near Strichen, 1900, *Trail.*—R.
R. thyrsoideus. Slains, 1901, apparently introduced, *Trail.*—R.
R. mucronatus. Cruden, 1901, *Trail.*—R.
R. melanoxylon. Aberdour and near Turriff, 1901, *Trail.*—R.
R. infestus. King Edward (probably this), 1900, *Trail.*—(R).
R. radula. Aberdour, 1901, *Trail.*—R.
R. foliosus. Methlick, 1900, *Trail.*—R.
R. corylifolius. St. Fergus and Fyvie, 1900, *Trail.*—R.
var. cyclophyllus. Tyrie, 1901, *Trail.*—R.
R. saxatilis. "Dickie's Flora Abred." "Top. Bot."—R.
R. Chamæmorus. "Top. Bot."; Bennachie, *Dickie* in "B. Guide."—R.

94. Banff.

R. idæus.—R.
R. Rogersii. By Mouth of the Fiddich, 1899, *Trail.*—R.
R. plicatus. Alvah, 1901, *Trail.*—R.
R. affinis. "Add. Rec. 1887."
R. melanoxylon.—Gamrie, 1901, *Trail.*—R.
R. infestus. Gamrie, 1901, *Trail.*—R.
R. radula. Gamrie, 1900, *Trail.*—R.
R. foliosus. Alvah, 1900, *Trail.*—R.
R. Koehleri, *subsp.* dasyphyllus? Tarlair, Gamrie, *Trail.*—(R).
R. corylifolius.—R.
var. sublustris.—(R).
R. saxatilis.—"Gordon, MS.," "N.B. Guide," 1837, and "Top. Bot."—R.
R. Chamæmorus. "Gordon MS.," "N.B. Guide," and "Top. Bot."—R.

95. Elgin.

R. idæus.—R.
R. Rogersii. Alves and Dunphail, *Marshall* and *Shoolbred*, 1899.—R.
R. plicatus, *var.* hemistemon. Near Brodie, *M.* and *S.*, 1899.—R.
R. affinis. Near Forres, *G. C. Druce*, "Add. Rec. 1887." In Mr. Rogers' list of 1895, but omitted from "Handbook" as he has not seen authentic specimen from north of Anglesey, the plant from Forres being probably *Selmeri.*
R. rhamnifolius. Near Forres, *G. C. D.*, "Add. Rec. 1887."—(R).
R. villicaulis (*s. strict.*). Garmouth, near Forres, etc., *M.* and *Sh.*, 1899.—R.
subsp. Selmeri. *G. C. Druce*, 1895.—[R].

R. macrophyllus. Near Forres, 1888, *G. C. D.*—[R].
R. hirtifolius, var. danicus. Dunphail, *M.* and *Sh.*
R. melanoxylon. Alves and Garmouth, M. and Sh., 1899.—R.
R. radula (*s. strict.*). Wood near Forres, *M.* and *Sh.*—R.
R. echinatus. Near Alyth, *G. C. D.*; "Add. Rec. 1888."—(R).
R. saxatilis. "Gordon, Cat., "N.B. Guide," 1837, "Top. Bot." —R.
R. Chamæmorus.—R.

96. East Ness.

R. idæus.—R.
R. fissus. *Somerville*, "Add. Rec. 1897."—(R).
R. suberectus. "Add. Rec. 1887"; near Kinchurdy, *G. C. Druce*, 1888—R.
R. Rogersii. Near Nairn, common, *Marshall* and *Shoolbred*, 1899. —R.
R. plicatus. "Add. Rec. 1892"; Kilmorack, *E. S. Marshall.* —R.
var. hemistemon. By Nairn River, *E. S. M.*, 1893.—R.
R. Scheutzii. 1900.—R.
R. villicaulis (*s. strict.*). *Marshall*, 1892, "Add. Rec."; Nairn, *M.* and *S.*, 1899.—R.
subsp. Selmeri. E. Ness and Nairn, *G. C. D.*—R.
R. macrophyllus (*s. lat.*). "Between Beauly and Kilmorack," *Marshall.*
subsp. Schlechtendalii, "Top. Bot."—(R).
R. hirtifolius.—R.
var. danicus.—Common round Nairn, 1899, *M.* and *Sh.*—R.
R. pyramidalis. Beauly, 1890, *G. C. D.*—R.
R. mucronatus. Kilmorack, 1892, and Nairn, 1899, *Marshall.* —R.
R. melanoxylon. Common about Nairn, 1899, *M.* and *Sh.*—R.
R. corylifolius. Beauly, 1892, *Marshall.*—R.
R. saxatilis. "Stables, *sp.*," "N.B. Guide," 1837, and "Top. Bot."—R.
R. Chamæmorus. "Gordon, *sp.*," "N.B. Guide," 1837, and "Top. Bot."—R.

97. West Ness.

R. idæus.—R.
R. fissus.—R.
R. suberectus. "Add. Rec. 1891"; Roy Bridge, 1896, *Marshall* and *Shoolbred.*—R.
R. plicatus. "Add. Rec. 1891"; Roy Bridge, 1896, *M.* and *S.* —R.
R. nitidus, 1900.—R.
R. affinis. "Top. Bot."
R. latifolius, 1895.—(R).

R. carpinifolius. *Macvicar*, "Add. Rec. 1893."—R.
R. Lindleianus. *Macvicar*, "Add. Rec. 1896."—R.
[R. rhamnifolius. Recorded in 1891, in error.]
R. Scheutzii, 1900.—R.
R. pulcherrimus. *Macvicar*, Add. Rec. 1893"; Fort-William, 1896, *M.* and *S.*—R.
R. dumnoniensis, Bab. *Macvicar*, "Add. Rec. 1893."
R. villicaulis. *Macvicar*, "Add. Rec. 1893"; (as *insularis*, Aresch.) Roy Bridge, 1896, *M.* and *Sh.*—R.
subsp. Selmeri. S.W. corner of Inverness-shire, *W. F. Miller*, 1895, "Add. Rec. 1895."—R.
R. macrophyllus. Roy Bridge, 1896, *M.* and *Sh.*—R.
R. hirtifolius, *var.* danicus (as *pyramidalis*, "Add. Rec. 1894").—R.
R. pyramidalis. (Recorded from Moidart in W. M. Rogers' list of 1895, but omitted from "Handbook," as incorrectly named, having been the preceding plant).
R. Boræanus. *Macvicar*, "Add. Rec. 1898."—[R].
R. mucronatus (as *mucronulatus*), "Top. Bot." Plentiful in Glen Roy and Glen Spean, 1896, *M.* and *Sh.*—R.
R. infestus. *Macvicar*, "Add. Rec. 1894"; Fort-William, 1896, *M.* and *Sh.*—R.
R. rosaceus, *subsp.* infecundus, Rogers. 1896, *W. M. R.*—R.
R. corylifolius. "Add. Rec. 1897."—R.
R. saxatilis. "N.B. Guide," 1837; "Top. Bot."—R.
R. Chamæmorus. "Top. Bot."—R.

98. Argyll.

R. idæus.—R.
R. fissus. "Top. Bot."; near Dalmally, *Marshall* and *Shoolbred*, 1894.—[R].
R. suberectus. "Top. Bot."—R.
R. Rogersii. Several localities, 1901, *W. M. Rogers.*—R.
R. plicatus. "Add. Rec. 1893," *W. M. R.* Sandbank to Glen Masson, 1901, *W. M. R.*—R.
R. affinis. Near Dalmally, *G. C. Druce*, 1888.
R. carpinifolius. Dalmally, *M.* and *Sh.*, 1894.—R.
R. Lindleianus. "Frequent," 1901, *W. M. R.*—R.
R. rhamnifolius. Dalmally, *G. C. D.*, 1888; *C. E. Salmon*, "Add. Rec. 1898."—R.
subsp. Bakeri. Hedge at Sandbank, 1901, *W. M. R.*—R.
R. Scheutzii. From Sandbank to Glen Masson, *F. A. Rogers*, 1901.—R.
R. dumnoniensis. Dalmally, *M.* and *S.*, 1894.—R.
R. pulcherrimus. Dalmally, *M.* and *S.*, 1894.—R.
R. villicaulis (*s. strict.*). Inveroran, 1894, *Marshall.*—R.
subsp. Selmeri. Dalmally, plentiful, *M.* and *Sh.*—R.

R. macrophyllus. 1900.—R.
subsp. Schlechtendalii. 1900.—R.
var. macrophylloides. Glen Masson, 1901, *F. A. Rogers.* —R.
R. hirtifolius, *var.* danicus. Glen Masson, 1901, *F. A. R.*—R.
R. pyramidalis. Kirn, 1901, *W. M. R.*—R.
R. cinerosus, Rogers. Dalmally, 1901, *W. M. R.*—R.
R. mucronatus. Near Dalmally, 1893, *M.* and *Sh.*—R.
R. melanoxylon. Dalmally, 1893, *M.* and *Sh.*—R.
R. infestus. Kirn, 1801, *W. M. R.*—R.
R. radula, *subsp.* echinatoides.—[R].
subsp. sertiflorus. Abundant about Arrochar, 1901, *Marshall.* —R.
R. Koehleri, *subsp.* dasyphyllus. Kirn to Glen Masson, 1901, *W. M. R.*—R.
R. saxatilis. "Top. Bot."—R.
R. Chamæmorus. Near Kingshouse, *M.* and *Hanb.*, 1889.—R.

(*To be continued.*)

SCOTTISH HIERACIA.

By James W. H. Trail, A.M., M.D., F.R.S., F.L.S.

In the 'Topographical Botany of Scotland,' it was stated ("Annals Scot. Nat. Hist.," October 1898, p. 230), that the records under *Hieracium* had been deferred, in the hope that Mr. Hanbury would be able to revise them, so as to secure greater accuracy. As he has not been able to fulfil his intention to do so, I have thought it better to issue the following notes, compiled by myself from records published by Messrs. Hanbury, E. and W. Linton, Marshall, and others, in recent years. It has been confined to those in Watson's "Topographical Botany," Ed. 2 (in brackets), and the later publications, to secure, as far as possible, uniformity of value in the nomenclature. The "species" of earlier records often differ so widely from those in the subjoined list, that it is not advisable to combine those of the two periods in such a list; and the revision of the records is a task that I cannot attempt to perform. The list has been prepared with care from the

sources indicated; but I can scarcely hope that it is free of errors. Corrections will be gratefully received. The numbers are, as in "Topographical Botany of Scotland," those of the Watsonian vice-counties.

Group Pilosella.

Hieracium pilosella, *L.*, all *except 97* and *112*.
var. nigrescens, *Fries.*, 90.
H. aurantiacum, L., 72, 87, 88, 93, 95.
(H. pratense, *Tausch*, in "Top. Bot." as H. collinum, 79, 83, 95.)

Group Alpina genuina.

(H. alpinum, *L.*, in "Top. Bot." 88, 90, 92, 96, 97, 98, 99, 104, 105, 108.)
H. alpinum, *segr.* (= H. melanocephalum, *Tausch*, of "Top. Bot.," which gives 90, 92, 96); recorded by Druce from 94, 96, 105, and by Marshall, in error, from 98.
H. holosericeum, *Backh.* (in "Top. Bot." 88-90, 92, 97, 98), 73, 88, 89, 94, 96-98, 105, 108.
H. eximium, *Backh.* (in "Top. Bot." 88-90, 92, 94, 97), 88, 89, 94, 96-98, ? 105.
var. tenellum, *Backh.*, 88, 92, 94, 96, 98, 105.
H. calenduliflorum, *Backh.* (in "Top. Bot." 88-90, 92), 88, 89, 97, 98.
H. graniticolum, *E. and W. Linton*, 92, 94, 96, 105.
H. gracilentum, *Backh.* (in "Top. Bot." 90, 92, 98), 88, 89, 94, 96-98.
H. petiolatum, *Elfstrand*, 92, 94, 96.
H. globosum, *Backh.* (in "Top. Bot." 89, 92, 94), 89, 94, 96, 105, 106, 108.

Group Alpina nigrescentia.

(H. pulmonarium, *aggr.*, in "Top. Bot." ?85, 88-90, 92, 94, 96, 97, 108.)
H. nigrescens, *Willd.* (in "Top. Bot." 88, 90, 92, 96, 97, and [85, 89, 94, 108]), 72, 88, 89, 92, 94, 96, 97, 105.
var. commutatum, *Lindeb.*, 92.
var. gracilifolium, *F. J. H.*, 87, 88.
H. atratum, *Fr. f.*, 87, 88, 97, 98, 105.
H. curvatum, *Elfstrand*, 88, 97, 108.
H. Backhousei, *F. J. H.*, 88, 92, 94, 96-98, 106.
H. lingulatum, *Backh.* (in "Top. Bot." 88, 90, 92, 96, 97), 87-89, 94, 96, 97, 105, 108.

H. senescens, *Backh.* (in "Top. Bot." 85, 88, 90, 92, 99), 87, 88, 94, 96-98, 105.
H. Marshalli, *E. F. Linton*, 88, 90, 92, 98, 108.
H. chrysanthum, *Backh.* (in "Top. Bot." 89, 90, 92, 96, 97, 108), 88-89, 94, 96, 97, 105.
var. microcephalum, *Backh.*, 88, 92, 97.
H. sinuans, *F. J. H.*, 87, 88, 98.
H. centripetale, *F. J. H.*, 72, 88, 92, 96, 97, 100.
H. submurorum, *Lindeb.*, 88, 90, 97, 98.

Group Alpina Hyparctica.

H. hyparcticum, *Almq.*, 108.

Group Amplexicaulia.

H. amplexicaule, L., 89.

Group Cerinthoidea.

H. callistophyllum, *F. J. H.*, 88, 90, 97, 98.
var. cremnanthes, *F. J. H.*, 87, 88, 92, 97, 98.
H. anglicum, *Fr.* (in "Top. Bot." 72, 85, 88-90, 92, 103, and [81, 83, 86, 91, 96, 97, 98, 104, 105, 108, 110, 111]), 85, 87-89, 94, 96, 98, 104, 105, 108-111.
var. acutifolium *Backh.*, 88, 90, 92, 96, 104, 108.
var. longibracteatum, *F. J. H.*, 88, 89, 93, 94, 97, 98, 104, 105, 108-110.
H. cerintheforme, *Backh.*, 88, 89, 97, 98, 110.
H. iricum, *Fr.* (in "Top. Bot." 92, 108, ?109, 111), 72?, 88-90, 98, 104, 105, 108, 110.
H. flocculosum, *Backh.* (in "Top. Bot." 90, 92, ?96), 88, 89, 97, 98, 108.
H. breadalbanense, *F. J. H.*, 88.
H. langwellense, *F. J. H.*, 72, 89, 97, 98, 107, 109.
H. clovense, *E. and W. Linton*, 72, 89, 90, 110.

Group Oreadea.

H. Leyi, *F. J. H.*, 88-90, 92, 105.
H. Carenorum, *F. J. H.*, 108.
H. Schmidtii, *Tausch* (= *H. pallidum* of "Top. Bot.," which gives it for 72, 80, 81, 83, 87-90, 92, 96, 98, 99, 106, 107, ?108, 109, 111), 72, 89, 93, 94, 98, 104, 105, 108, 110.
var. crinigerum, *Fr.* (in "Top. Bot." 92), 96, 110, ?112.
H. lasiophyllum, *Koch*, 89, 90, 110.
var. euryodon, *F. J. H.*, 88, 89, 90, 92.

H. farrense, *F. J. H.*, 88, 89, 90, 92, 108.
H. eustales, *E. and W. Linton*, 88, 92.
H. proximum, *F. J. H.*, 108, 109.
H. caledonicum, *F. J. H.*, 92, 104, 106-111.
H. rubicundum, *F. J. H.*, 72, 90, 92, 99, 105, 108, 109, 111.
var. Boswelli, *E. and W. Linton*, 88, 104, 105, 108-111.
H. Oreades, *Fr.*, 110.
var. subglabratum, *F. J. H.*, 90, 108, 109.
H. pseudonosmoides, *Dalst.*, 88, 89, 95.
H. argenteum, *Fr.* (in "Top. Bot." 89-92, ?108, 109), 72, 87-90, 92, 97, 98, 105, 109, 110.
var. septentrionale, *F. J. H.*, 108.
H. nitidum, *Backh.* (in "Top Bot." 92, 96), 72, 90, 97, 107, 108.[1]
H. Sommerfeltii, *Lindeb.*, 72, 88, 89, 90, 92, 97, 104, 105, 108, 109.
var. tactum, *F. J. H.*, 97, 98.
H. scoticum, *F. J. H.*, 90, 108, 109, 110.
(H. onosmoides, *Fr.*)
var. buglossoides (*Arv. Touv.*), 72, 79, 88, 89, 92, 99, 104, 106, 107, 112?.
(H. saxifragum, *Fr.*)
var. orimeles, *F. J. H.*, 98, 112.

Group Vulgata.

H. stenolepis, *Lindeb.*, 72, 92, 104, 108, 110.
var. anguinum, *W. R. Linton*, 72, 108.
H. aggregatum, *Backh.* (in "Top. Bot." 90, 92), 88, 90, 96, 97.
var. prolongatum, *F. J. H.*, 88.
H. Pictorum, *E. and F. Linton*, 88, 90, 92, 97, 98.
var. dasythrix, *E. and F. Linton*, 87, 88, 97, 98.
H. rivale, *F. J. H.*, 87-90, 92, 97, 104, 107, 108, 110.
var. subhirtum, *F. J. H.*, 87-89, 97, 98.
H. pollinarium, *F. J. H.*, 108.
(H. murorum, *L. aggr.*, in "Top. Bot." all *except 73-74, 97, 98, 103.*)
segr. (in "Top. Bot." 90, 92), 87-89, 94, 96, 98, 104.
var. micracladium, *Dahlst.*, 75, 83, 86, 88, 90, 108.
var. camptopetalum, *F. J. H.*, 109.
var. crassiusculum, *Almq.*, 108.
var. variicolor, *Dahlst.*, 88, 89.
var. ciliatum, *Almq.*, 72, 88, 99, 105, 108.
var. caliginosum, *Dahlst.*, 88.
var. sagittatum, *Lindeb.*, 88, 89.
var. sarcophyllum, *Stenstr.*, 72, 88, 97, 108.
var. subulatidens, *Dahlst.*, 90.
H. euprepes, *F. J. H.*, 87-90, 92, 97, 98, 110.
var. glabratum, *E. and W. Linton*, 87-90.

H. orcadense, *E. and W. Linton*, 111.
H. rubiginosum, *F. J. H.*
H. duplicatum, *Almq.*, 88.
H. cæsium, *Fr.* (in "Top. Bot." 90, 92, 108, 111), 72, 88, 89, 92, 94, 96, 97, 104, 105.
var. pallidum, *Dahlst.* (72, 105)?
H. insulare, *F. J. H.*, 88.
var. petrocharis, *E. and W. Linton*, 88.
H. cæsiomurorum, *Lindeb.*, 88, 89, 92, 96, 98, 108.
H. orarium, *Lindeb.*, 89, 108, 109, 110.
var. erythræum, *E. and W. Linton*, 108.
var. fulvum, *F. J. H.*, 108, 109, 111.
H. duriceps, *F. J. H.*, 72, 87, 88, 98, 104, 105, 107, 108, 112.
var. cravoniense, *F. J. H.*, 108.
(H. gravestellum, *Dahlst.*)
var. rhomboides, *Stenstr.*, 88, 90, 92, 98, 108.
("H. sylvaticum, *L.*," *aggr.*, in "Top. Bot." for all *except 72, 74, 84, 93, 105, 111.*)
H. dissimile, *Lindeb.*, 108.
var. poliænum, *Dahlst.*, 92, 96, 109.
H. vulgatum, *Fr.* (in "Top. Bot." 78, 83, 85-90, 92, 96, 103-105), 72-74, 76, 87-89, 93-95, 97, 98, 102, 105, 108-110.
H. stenophyes, *E. and W. Linton*, 72, 88?, 97, 99?, 108.
H. subanfractum, *E. S. Marshall*, 88, 97, 98.
H. angustatum, *Lindeb.*, 72, 88, 90, 92, 108.
H. subramosum, *Lönnr.*, 85.
(H. diaphanum, *Fr.*)
var. stenolepis, *Lindeb.*, 89.
H. diaphanoides, *Lindeb.*, ? 72.
var. apiculatum, *E. and W. Linton*, 90.
H. sciaphilum, *Uechtr.*, "embraces a large portion of the specimens labelled '*H. vulgatum*, Fr.' in our herbaria," F. J. Hanb.

Group Rigida.

H. gothicum, *Backh.*, *aggr.* (in "Top. Bot.," from 80?, 85, 87, 90, 92).
segr. (72, 77), 88-90, 96, 104, 109.
var. latifolium, *Backh.*, 88, 90, 104.
var. basifolium, *Lindeb.*, 88, 90.
H. sparsifolium, *Lindeb.*, (72, 73), 88, 97, 98, 104, 105, 107, 110.
H. rigidum, *Hartm.*, 93.
var. Friesii, *Hartm.*, 109.
var. tridentatum (*Fr.*), (in "Top. Bot." 87), 72, 88.
var. longiciliatum, 92.

Group Alpestria.

H. pulchellum, *Lindeb.*, 112.
H. zetlandicum, *Beeby*, 108, 112.
H. truncatum, *Lindeb.*, 87, 96, 97.
H. protractum, *Lindeb.*, 112.
H. dovrense, *Fr.*, 97, 106, 108, 112.
var. Hethlandiæ, *F. J. H.*, 112.
var. spectabile, *E. S. Marshall*, 89.
H. Dewari, *Boswell*, 87-89, 96-99.

Group Prenanthoidea.

H. prenanthoides, *Vill.* (in "Top. Bot." [77, 81, 83, 84, 85, 86, 89, 90, 91, 95, 104], with ? 79, and as good records 88, 92, 96, 109), 87-89, ? 90, ? 91, 108.
H. Borreri, *Syme* (in "Top. Bot." 79 ? and 99).

Group Foliosa.

H. strictum, *Fr.* (in "Top. Bot." 85, 87, 88, 90, 96, 98, 99, 102, 108, 111), 89, 95-97, 104, 106-110.
var. reticulatum (*Lindeb.*), 88, 92, 96, 98, 105, 106, 108, 109, 110.
var. angustum (*Lindeb.*), 88, 89, 92, 95, 97.
var. opsianthum, *Dahlst.*, 87, 88.
var. subcrocatum, *E. and W. Linton*, 72, 79, 97.
var. amplidentatum, *F. J. H.*, 85, 88, 89, 96-98, 111.
H. corymbosum, *Fr.* (in "Top. Bot." 77, 80, 87-90, 92, 96, 103, 108, 111), 88, 89, 91-93, 96, 105, 106, 108, 109.
var. prælongum (*Lindeb.*), 88, 105.
var. salicifolium (*Lindeb.*), 87, 89, 97 ?.
H. auratum, *Fr.*, 72, 87-89, 92, 96-98, 105, 107-109, 111.
var. thulense, *F. J. H.*, 112.
H. crocatum, *Fr.* (in "Top. Bot." 79, 80, 87-92, ? 96, ? 98, 103-109, [112]), 72, 73, 87-89, 96-98, 104-106, 109.
var. trichophyton, *Almq.*, 88.
var. pycnophyllum, *Lindeb.*, 88.
H. maritimum, *F. J. H.*, 108.
H. boreale, *Fr.* (in "Top. Bot." from 73, 76, 77, 79-81, 87, 90-92, 94, 99-102, 104), 72-75, 87, 88, 95.
H. umbellatum, *L.* (in "Top. Bot." 72, 73, 80, and with ? from 77, 81, 83, 88, 90, 91, 100-102, 108, 109), 72-75, 88, 90, 95, 96, 98.
var. filifolium, *Backh.*, 96.
var. pauciflorum, *Hartm.*, 108.

Note.—In the "Journal of Botany" (July 1902, pp. 257-260), Mr. Fred. N. Williams discusses *H. anglicum*, Fr., and allied forms, and states the following conclusions that modify the names in the list:—As varieties of *H. anglicum* in Scotland, he gives—α, *genuinum*, Syme, which ascends to 810 m. in S. Aberdeen; β, *acutifolium*, Backh.; δ, *longibracteatum*, F. J. Hanb.; ζ, *amplexicaule*, Backh., Scottish Highlands; θ, *brevifurcatum*, F. N. Williams (= *H. Leyi*, F. J. Hanb., of above list). To *H. anglicum* he also refers (with reasons for doing so) *H. langwellense*, F. J. Hanb., and *H. Carenorum*, F. J. Hanb., both of the above list.

Mr. Williams also discusses ("Journal of Botany," August 1902, pp. 291-293) "*Hieracium murorum* and *H. cæsium* of British Floras," and gives reasons for the following changes:—"*H. murorum*," Brit. auct., must stand as *H. silvaticum*, Gouan, (being "*H. murorum*, var. β. *silvaticum*," of Linnæus). *H. stenolepis*, Lindeb., of the above list has been reduced to rank as a variety of *H. silvaticum* by Almquist, with the concurrence of Dahlstedt.

"*H. cæsium*," Brit. auct., *non* Fries., must bear name *H flocculosum*, Backh. *var.*, Mr. Williams suggesting that Mr. J. G. Baker's name might be associated with it. *H. cæsium*, Fr., = "*H. murorum*, var. α," of Linnæus, and has not been found in Britain.

ZOOLOGICAL NOTES.

Bank Voles as Garden Pests.—We have been considerably bothered by a visitation of "mice" in and around the garden here this summer, and I cannot say that our feelings of annoyance are lessened by the fact that Mr. Service has identified our visitors to belong to the comparatively scarce species, the Bank Vole or Red Field Vole (*Microtus glareolus*). However, it may be worth recording their presence here in numbers. Their chief resort is my rock garden, where they do continual damage among my alpine and choice herbaceous plants, and are very difficult to entrap. In the kitchen-garden perhaps their worst depredations have been among the cauliflowers; they have almost ruined our crop. On the other hand, they have scarcely touched strawberries, which sometimes have suffered from common mice.—W. D. R. Douglas, Orchardton, Castle-Douglas.

Black Mountain Hare in Caithness-shire.—A Black Hare (*Lepus variabilis*), a female, was shot by Hector Urquhart, one of the under-keepers to His Grace the Duke of Portland, at Braemore, Langwell, Caithness, on the 3rd of February this year, and sent

here to be preserved. The coat is glossy black, with no white except half-a-dozen white hairs at the joint of the hip. The measurements and characters correspond exactly with those of the White or Mountain Hare. When cased it is to be sent to Langwell House, Caithness.—Lewis Dunbar, Thurso.

Grampuses in the Solway.—On 27th July I was interested in watching a herd of Grampuses (*Orca gladiator*) off Southerness Point. There were certainly half-a-dozen animals in the drove, and there might be a dozen, but, of course, they could not be seen all at once, and we could only guess at the real number as they rose and plunged on the surface of the waves at different spots. Some of the beasts were fully adult, while others were only half-grown. Salmon were plentiful in the Firth at the time, and doubtless these Cetaceans had come up in pursuit. I did not see any salmon myself rise in front, as they do when Porpoises and Grampuses are after them, but 4 or 5 miles farther up the Firth some friends who were watching them saw the salmon leaping frantically out of the tide as the Grampuses came close upon them. It is an ordinary and common sight to see Porpoises in the Solway—often in considerable herds—but a sight of Grampuses up the Firth is a much rarer occurrence. These animals were upon this occasion quite as wary as usual, keeping well out in the channel, and turning with the first of the ebb, so as to avoid the ever-present possibility of being caught aground on some of the great banks.—R. Service, Maxwelltown.

Bird Notes from the Island of Coll.—This spring, about the 10th April, when a field near the Castle at Coll was being ploughed, four of the many Common Gulls (*L. canus*), as usual, closely following the plough, were killed or disabled by the tilth turned up by the plough falling back on them. Colonel J. Lorn Stewart, the laird, went to see the scene of this accident and the dead gulls. An old man who had ploughed for many years in Coll informed me that he had several times known single gulls killed in this manner, but never as many as four.—On the 12th June I saw, on the shore, a lot of nine Sanderlings (*Calidris arenaria*). Eight of these were in perfect summer plumage, the ninth very slightly so. They were very tame, allowing me to watch them within about five yards' distance. The above date is very late to observe these birds.—Many Little Stints (*Tringa minuta*) were about Crossapoll sands in April 1902. This bird was not included in List of Birds observed in Coll (Annals Scot. Nat. Hist., 1899, pp. 206-9).—On the 15th June I saw a pair of Yellow Hammers (*Emberiza citronella*), evidently nesting. This is an addition to list of birds breeding in Coll.—On the same day I saw a single Arctic Tern (*Sterna macrura*) bully a Heron, which I had flushed from the sea-shore. The Heron appeared to be in abject terror, and, continually shrieking out its "crank, crank," came

back within shot of me, settling down again not far off. I find that a plant which is much eaten by wild-fowl in winter is the Water-Lobelia (*Lobelia dortmanna*), which grows in vast profusion near the shores of most of the lochs.—L. H. Irby, London.

The Starling Roost on Cramond Island.—The Starlings which have frequented Cramond Island for some years back, and in remarkable numbers since the autumn of 1899, seem to have deserted the place. In the January number of the "Annals" an account was given of the daily migrations of the birds up to November 1901. From that date onwards there was nothing in their movements that differed from what had been observed in the previous seasons. Towards the middle of June this year the usual number of Starlings frequenting the island was noted, and up to the end of the month they continued to cross regularly. About the beginning of July they ceased to come under observation, and only small flocks were occasionally seen. On the 18th of September I visited the wood where the Starlings roosted, and was not at all surprised that the birds had forsaken the place. Despite the rainy season, the branches were still quite encrusted with the excreta of the Starlings, and a good number of the trees had been killed as the result. The stench of the place was very disagreeable. From inquiries made I find that the period during which the Starlings have frequented this plantation (five years) is about the average length of time these birds have been noticed to occupy a particular roost.—Chas. Campbell, Dalmeny Park.

Note on the Swift.—One pair were seen on 10th May here by a good observer. I did not note any personally until 25th May; but they stayed, for this district, unusually late in autumn. My average date for their departure is 9th August. This year Swifts (*Cypselus apus*), some days as many as five, were seen until 17th August about Dumfries, and on 21st August I saw a pair at Auchencairn.—R. Service, Maxwelltown.

Turtle Dove and Quail in Southern Shetland.—During the second and third weeks of June we had a good many Turtle Doves about. They first appeared after a severe gale from the S.S.W. on the 28th of May, and for some days after a few were seen, and I heard of them here and there all over the parish. I feel sure we must have a considerable number of Quails breeding here this year, as I hear them calling all around.—Thomas Henderson, Jun., Dunrossness.

Scarcity of the Landrail.—During this phenomenally sunless season now drawing to an unregretted close, I have seen one Landrail (*Crex pratensis*) only, and have not heard the call of the bird half a score of times in all. Were they really so scarce, or has the season condemned them to silence?—R. Service, Maxwelltown.

Late Nesting of the Woodcock.—I think it may interest you to know that a Woodcock's nest with two eggs and one young bird was found in Kintore Parish on the 19th of August by some men who were cutting ferns. The eggs proved to be rotten, and the keeper who gave them to me informed me that the young one was carried off by one of its parents. Is not this a very late date for this bird to breed?—THOMAS TAIT, Inverurie.

[The Woodcock is sometimes double-brooded, and there are instances on record of nests having been found in July and August. We believe, however, that such occurrences are quite exceptional.—EDS.]

Black Terns near Hawick.—On 2nd June several Black Terns (*Hydrochelidon nigra*) were observed flying over some mossy land near Hawick, and one of them, a male, was shot and sent to me for preservation.—CHARLES KIRK, Glasgow.

Fulmars in Sutherland in the Nesting Season.—When visiting Handa on 4th July, the fishermen whom we had with us pointed out a pair of Fulmar Petrels about fifty yards away. At this distance it was difficult for me to distinguish them, and from the overhanging nature of the cliffs it was impossible to follow them far in their flight. On the 8th, when visiting Clomore Head near Cape Wrath, I saw several pairs flying high up and on a level with the top of the cliffs. Sometimes they came within a few feet of me, and I easily made out their yellow-tipped beaks. At this time the weather was threatening a gale from the north with heavy mist, and when the mist cleared I saw several of the same birds flying out and in from a grassy ledge on the face of a cliff. As they alighted they promptly disappeared, to reappear again in a few minutes; doubtless they were feeding their young. The 9th was very stormy, with rain, but the 10th was fair though blowing strongly from the north. On this date the birds were flying low, and I saw them again landing on the ledge and one was sitting on the grass. Farther along one disappeared under an overhanging rock, but the wind was too strong to venture to the edge of the cliff to see where it had gone to. I should think that there were about a dozen pairs in all.—THOMAS TAIT, Inverurie.

Poultry feeding on Slow-worms.—At the end of August a lady sent me from Colvend a couple of fowl's stomachs, each containing large fragments of Slow-worms (*Anguis fragilis*). She had selected a good, fat, full-grown chicken, and on dressing it for table she found the greater part of a Slow-worm inside. Not liking the idea of using the fowl for food, it was laid aside. Another chicken was taken and killed, and an examination was at once made of its interior. Similar pieces of this reptile were also found in the second chicken. The old Scottish prejudice against serpents, eels, and such-

like asserted itself strongly, and chickens for table purposes were tabooed in the meantime. The fowls in question had been reared, and were running, upon a large piece of rough uncultivated hill ground to the rear of a farmhouse. Cocks and hens do on occasion devour strange things, and I have seen a hen chase, catch, kill, and swallow—not without much straining and gulping—a mouse.—R. Service, Maxwelltown.

Lepidoptera in Banffshire.—In July last, *Argynnis aglaia*, Linn., was not uncommon on the Banffshire coast. At one part, where the rock-cistus (*Helianthemum vulgare*) abounds, I found the rare *Polyommatus artaxerxes*, Fabr. My son caught the first specimen seen. He also captured a worn specimen of the Painted Lady (*Pyrameis cardui*, Linn.) beside the cairn on the Binn of Cullen, 1050 feet above sea-level. The Six-spot Burnet Moth (*A. filipendulæ*) was flying in great numbers over the bent in one valley close to the beach.—Henry H. Brown, Cupar-Fife.

Pupa Anglica (*Fér.*) in Midlothian (Forth Area).—On 14th June last I found a few specimens (one of which has been shown to Mr. J. W. Taylor, Leeds) of this small mollusc on withered sedge-leaves in a wet spot in the wooded ravine of the Fullarton Water (a tributary of the Esk) below Edgelaw, Midlothian. In Roebuck's "Census" of Scottish Land and Fresh-water Mollusca no locality falling within the Forth area is given for the species, but many years ago it was recorded from "Banks of the Esk" in Stark's "Picture of Edinburgh" (1834).—William Evans, Edinburgh.

BOTANICAL NOTES AND NEWS.

The Rowan-tree and its Parasites on Speyside.—August of this year was spent by me near Kincraig. The Rowan (*Pyrus Aucuparia*, Ehrh.) is of frequent occurrence in the district; and, as Junipers are also very abundant, the leaves of most of the Rowans showed the orange-yellow thickened spots due to *Gymnosporangium juniperinum* in the stage formerly known as *Roestelia cornuta*. Some trees had the leaves so severely attacked that it seemed the fungus must seriously weaken the hosts, yet the latter seemed not much the worse. But the parasite that most interested me was *Aphis Sorbi*, Kalt., on account both of its action on the twigs and of its relation to the Wood Ant (*Formica rufa*). My attention was drawn to the presence of a parasite by the strange appearance of the twigs on certain young trees. The leaves were rolled backward into balls from 1½ to nearly 3 inches in diameter. On one tree of about seven feet in height and little branched, I

counted nearly forty such balls, the twigs being almost all affected. The shoot remains stunted, and the leaves are barely half their normal size. The leaf-stalks and chief veins are thickened and unusually hairy. On the backs of the leaves in the beginning of August were many young insects, apterous females, and a few pupæ. By the end of August the winged insects had emerged and taken flight, and only a few wingless and young insects remained. Some of the insects agreed well with the description and figures of *A. Sorbi*, Kalt., but others showed considerable variability in the ground colour, from olive-green to dull yellowish white; and of the winged females, some had blackish transverse markings over a large part of the upper surface of the abdomen, while others showed only the row of dots down each side, as described by Buckton. I am not aware of this Aphis having been recorded from Scotland previously. It was not altogether easy to examine the pseudogalls. Whenever the twigs were touched, Wood Ants swarmed out from between the leaves of the balls, and at once placed themselves in the position to resist interference with what they evidently regarded as their possessions. Every ball was occupied by the ants, often about a dozen in each, and they formed a very efficient guard. It reminded me of the very close relations that exist between numerous plants and ants in the tropics (as I frequently have seen them in Brazil); only, on the Rowan the ant-dwellings are due to the presence of a parasite hurtful to the plant though useful to the ants, not due to peculiarities in structure of the host plants.—James W. H. Trail.

The year 1902 has established a very bad record in Scotland for continued inclemency and low temperature. Agricultural reports from all parts of the country indicate a general agreement that vegetation shows over a month's backwardness as compared with a fairly warm season. The first barley was cut in Aberdeenshire in the last week of August, and a field of oats was begun on 5th September; but both these were in the very early district of Fyvie, and almost everywhere oats were still quite green in September. The Ling (*Calluna Erica*) only began to open towards the end of August, at a date when it is frequently almost out of flower. Careful records of the effects on vegetation of so marked a departure from normal seasons would be of much interest.

At the Conference of the Pharmaceutical Society in Dundee in August, the President, Mr. George Claridge Druce, M.A., F.L.S., took as the subject of his address, "The Progress of Scottish Botany" from the year 1684 onwards, that year being selected as that in which appeared Sibbald's "Scotia Illustrata." The importance of the work of the earlier explorers is well shown, G. Don's contributions especially being very fully treated. The species and forms peculiar (within the British Islands) to Scotland are enumerated

and their distribution discussed. The address is a very valuable contribution to the history of the botanical investigation of Scotland, a work in which Mr. Druce has taken no small part.

"The Hepaticæ of the British Isles," by Mr. W. H. Pearson, has been completed, the last part having been published.

CURRENT LITERATURE.

The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—July-September 1902.

[The Editors desire assistance to enable them to make this Section as complete as possible. Contributions on the lines indicated will be most acceptable and will bear the initials of the Contributor. The Editors will have access to the sources of information undermentioned.]

ZOOLOGY.

Late Nesting of Terns. W. E. Frost. *The Field*, 23rd August 1902, p. 364.—Nest with two eggs found near the Isle of Ulva, Argyllshire, on 15th August.

Notes from the Gatty Marine Laboratory, St. Andrews. By Prof. M'Intosh, M.D., LL.D., F.R.S. *Ann. and Mag. Nat. Hist.*, September 1902, pp. 252-260, pl. vi.—The notes refer to Fishes and Worms, some of which are of Scottish origin.

List of Species, Varieties, and Aberrations of Lepidoptera so far only recorded from the British Islands. By J. W. Tutt, F.E.S. *Ent. Record*, 1st and 25th July 1902, pp. 186-188 and pp. 202-205.—Several Scottish forms referred to.

Lepidoptera in Perthshire. E. Rogers Bush. *Ent. Record*, September 1902, pp. 249-250.—This note refers to Cirrhœdia xerampelina, Drymonia chaonia, Anticlea sinuata, and Thera simulata.

Pyrameis (Vanessa) cardui in Fifeshire. Henry H. Brown. *Entomologist*, August 1902, p. 219.—Specimen taken from Kemback Hill on 28th June.

The Habits of Nyssia lapponaria. Percy C. Reid. *Ent. Mo. Mag.*, September 1902, p. 222.—Notes on specimens taken at Kinloch Rannoch.

Acosmetia caliginosa in the Hebrides. Charles G. Barrett. *Ent. Mo. Mag.*, August 1902, p. 184.—Suggests that occurrences of this species are due to a sporadic migration. The possibility of its having a habitation somewhere in the far west is also alluded to.

Xenolechia æthiops in Dumbartonshire. J. R. Malloch. *Ent. Mo. Mag.*, July 1902, p. 161.—A long note giving particulars of the capture of this species in April.

Coleoptera in Scotland. T. Hudson Beare, F.R.S.E., F.E.S. *Ent. Record*, 25th July, pp. 222-223.—Eleven species of water-beetles captured in a small stream near Polmont, Stirlingshire, on 28th September 1901, and forty-one of Coleoptera in general near Peebles in January 1902.

Coleoptera in Scotland. T. Hudson Beare, F.E.S. *Ent. Record*, September 1902, pp. 241-242.—Notes on about thirty species captured in various localities.

Coleoptera at Rannoch. T. Hudson Beare. *Ent. Mo. Mag.*, August 1902, p. 179.—Eighteen species recorded, which were taken from 27th to 29th June.

Notes on Scottish Crustacea. By Thomas Scott, F.L.S. *Ann. and Mag. Nat. Hist.*, July 1902, pp. 1-5, pl. i.—Four species are dealt with, two of which are described as new to science.

BOTANY.

Notes on the Flora of the Shores of the Firth of Forth. By M. King. *Trans. Edin. Field Nat. and Micr. Soc.*, Session 1900-1901, pp. 202-205.

Notes on the Topography and Flora of Strath Dearn. By S. Archibald. *Trans. Edin. Field Nat. and Micr. Soc.*, 1900-1901, pp. 161-164.

Hieracium anglicum, Fr., and its Varieties. By Frederic N. Williams, F.L.S. *Journ. Bot.*, 1902, pp. 257-260.—Discusses and describes various forms and their distribution; and refers *H. Leyi*, F. J. Hanb., *H. langwellense*, F. J. Hanb., and *H. Carenorum*, F. J. Hanb., to *H. anglicum*, Fries.

Hieracium murorum and H. cæsium of British Floras. By F. N. Williams. *l.c.* pp. 291-293.—See *note* to paper on Scottish Hieracia, p. 250.

A Catalogue of the British Marine Algæ. By E. A. L. Batters. *Journ. Bot.*, 1902, *suppl.*, pp. 33-56.

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